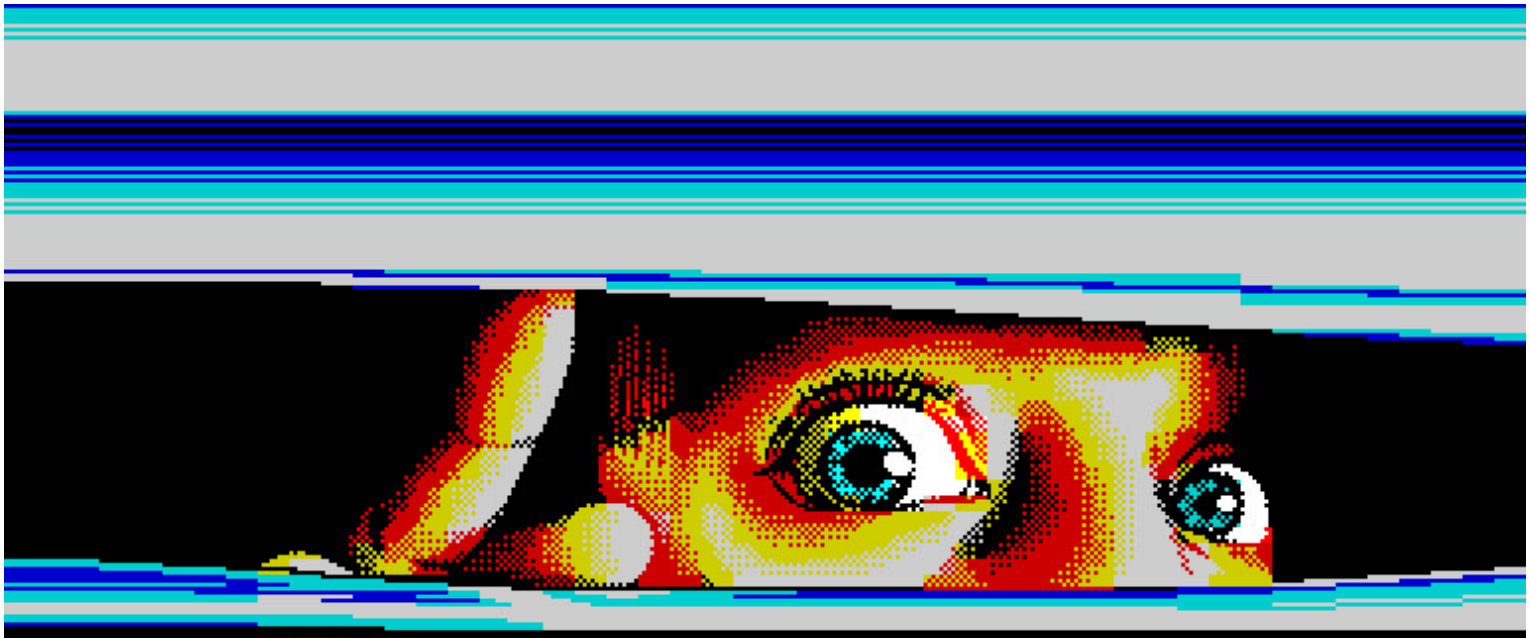
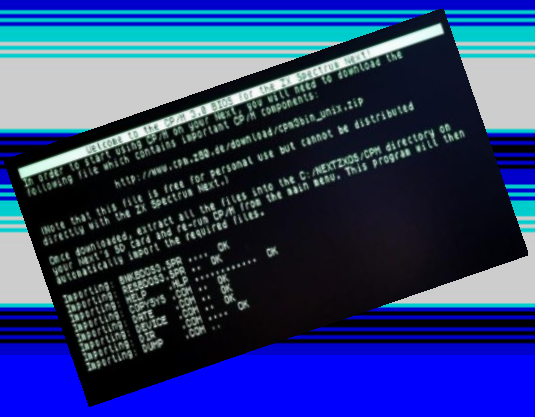
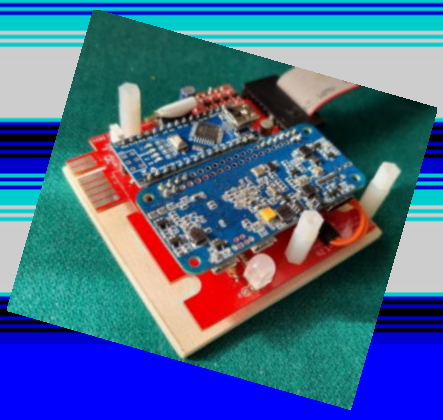
SUC-SESSION







- News
- Review of the SPECTRUMANIA 2022
- ZX SPECTRUM 48 rebuild, part 3&4
- The "SPECTRUM MECHANICAL JOYSTICK".
- CP/M on the ZX SPECTRUM NEXT
- OQTADRIVE - a modern alternative to the Microdrive/IF1
- Retro programming with modern means
- And much more ...

ISSUE

234.

OF YOUR MAGAZINE

YOUR MAGAZIN FOR THE SINCLAIR ZX SPECTRUM

EDITORIAL

Dear Club Members,

Here it is, the first issue in 2023. Unfortunately, the English edition has been delayed by more than six weeks. The translated texts need to be proofread and sometimes there are unforeseen problems that need to be fixed. This can always happen and we ask for your indulgence.

Once again, we have spared neither expense nor effort to present you with an unparalleled issue. The magazine was so expensive, Thomas even sold his Ferrari for it.

Okay, that's not entirely true, of course. Thomas still has his Ferrari and the magazine didn't cost any more than all the others before it. But that's why we tried to keep you up to date with what's happening in the ZX Spectrum world - if that's possible for a medium like this magazine.

Fortunately, the COVID pandemic is over now and we can get back to the daily routine as it was before. Although that's not entirely true: the madman from Russia is still hitting Ukraine and small hotspots of COVID outbreaks keep flaring up. So there are definitely still limitations. Nevertheless, life has returned to normal to some extent.

In the magazine you will find again all kinds of interesting things. The members who have worked on this issue have once again put in a lot of effort to write interesting and exciting articles - although the deadline I announced seems to be rather a hypothetical date...

I have another problem and a really urgent request to you. At the moment I am working on bringing the old issues of the SUC Session and its predecessor, the Spectrum Userclub Wuppertal, into a readable form. The club magazines were made in the time before I took over the magazine. I edit the scans, straighten skewed, glued in, articles, which is relatively easy thanks to Paint.net, add text passages that are no longer readable, if that is possible, and finally put all together in a PDF. The edited club magazines will then be uploaded to an online database when they are all finished and will be available to anyone who wants them. However, I have a problem: there are quite a few issues missing, mainly from the early days of Spectrum Userclub Wuppertal, as well as a few magazines in between. I would like to add these issues of the Userclub Wuppertal and therefore I depend on the members who were already there in the early days. So if you look in your archives, shelves, in the boxes in the basement or attic, maybe also in the aquarium, and find the said issues, please send them to me, on loan of course. I will scan them and send them back to you. The online museum Binarium has, as I found out, received the original copies from *Rolf Knorre*, but won't lend them out. And to drive more than 600 kilometers across Germany for that is honestly too much and too expensive for me. Further I would like to write an article about Rolf Knorre. I myself have talked to him once on the phone. That was somewhere in the 80s. So I don't know him. Maybe you have some memories you would like to share with me. I would be happy about that.

That's it from my side. I wish you a good time and stay healthy.

Many greetings from the editorial office from

Joachim und Thomas

April 25nd, 2023

CONTENT

Editorial, Content & Imprint 2
How to subscribe to the SUC Session 3
Readers letters 4
News in short 6
SCENE+ 77 7
How to hack a program: CUBELON 10
Traveling with the Spectrum User Club 11
Books 12
My Spectrum Collection 16
Reconstruction of a ZX Spectrum 48K Part 5&6 19
VTECH TV IQ 512 EDUCATION COMPUTER 22
The ZX Spectrum Next »DOT« commands 23
New life for »Currah µSpeech« 25
Adventure solution »The Arrow of Death (Part 2)« 27
Adventure solution »Escape from Pulsar 7« 29
Adventure corner 31
Games 2021 33
Retro-robot »HERO 1« 36
Basic Gimmicks 39

IMPRINT

The **SUC-Session magazine** appears in German and English and can be subscribed at the **»Spectrum-User-Club«**. For further information please contact **Thomas Eberle**.

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We thank all helpers for their contributions.

Copy deadline for SUC SESSION 235
Sunday, 07. May 2023

HOW TO SUBSCRIBE TO THE SUC SESSION

In general, the magazine is the main service of the SPECTRUM-USER-CLUB. The magazine is made by Spectrum users and for Spectrum users. Everyone can participate. By participating you can earn the magazine.

The magazine is offered in subscriptions â three issues. Usually three issues are published per year.

Subscription 1:
Three issues as a printed version
Prices:
Germany: 22.00 €
EU-wide: 26.00 €
Worldwide: 29,00 €

Subscription 2:
Three issues as PDF
Price worldwide: 4,50 €

We are planning an exclusive access to reader-only content, software and older (backup) PDF issues of the SUC Session for download. Until the website for this is up and running, this content will be sent by email on request.

The club has the following bank details,

(only use this data, not the data of the Sintech company!):

IBAN: DE93630500000719102,
BIC: SOLADES1ULM,
account holder: Mirko Seidel

PAYPAL payment is also possible:
https://www.paypal.me/Micro256

or via our website
www.speccy-scene.de

Of course you can also use other payment methods like money by registered mail, cheque or other. It would also be important to send us an e-mail or call us for the address details.

Instead of paying in Euros, you can also pay in SUC points, 1 point is worth 1 Euro. There are the following points:

1) Submit article 2 points, activated on Publication
2) Translate article German-English or English-German 1 point
3) Enquiries and small letters to the editor do not get any points for the time being, but whoever sends a letter to the editor that can be used as a real article, will of course also get one point for it.

If you are interested in helping out, please contact us. We distribute translation work and try to keep things in order so that two authors do not work on the same topic.

If you already have a subscription, we will contact you when it expires. In this case please respond immediately so that we can plan the quantities for the next issue in good time.

READERS LETTERS

Dear Spectrum friends,

in the last issue we received a not so nice letter from a reader. We have answered it and for us the matter is over. But there was still some shaking of heads and also a letter to the editor about this from *Dieter Hucke* from Hofgeismar/D, which we publish here and thus start the letters to the editor section:

After reading the letter to the editor by Heinz Köchler, my first reaction was: "Cool that this critical letter was printed, it takes courage". Respect to the SUC; that you did not simply delete this "contribution".

So a Heinz Köchler claims to be a connoisseur of the Sinclair community... I am at home in the Sinclair scene since 1982, have experienced the Spectrum Profi Club with Wolfgang Haller, the CK, the SUC with then Rolf Knorre, then Thomas Eberle, got to know several club meetings and Spectrum magazines - a Heinz Köhler was never there.

My modest contribution to the SUC is proofreading English articles, so I am forced to read them carefully, so to speak. I also check the links that are given, test randomly whether information is really correct, and follow up statements that describe errors, for example, to see whether they are really true. With all modesty I note that the statement of Heinz Köchler is not true that articles are simply compiled from Wikipedia. Wikipedia is also for me a valuable reference work, I stand by that. But "simply copying" needs to be well considered, especially since our articles are not always about the pure technical statement, but about a topic where Wikipedia provides valuable supplementary information.

What I want to get at: Our SUC magazine, as faulty and incomplete as it may be, is very important for me, Dieter Hucke, for my hobby with the Sinclair ZX Spectrum. I am thankful that many of us/you keep sharing your experiences and hardware manuals. Without the SUC a really great common platform would not exist, and I would find that very bad.

To Heinz Köchler: People like you ruin what few enthusiastic initiatives are left. I am glad that the SUC dealt with your contribution in a very fair and neutral way, but - YOUR contribution was the closest to what you criticized in the other contributions: I don't like it, it was just bad, unprofessional and superfluous.

Dieter Hucke

Thank you Dieter, there is nothing to add.

***Stefan Schomburg* from Malsch offers the prospect of more cooperation:**

Hello Thomas!

Thank you for the new SUC session. Very nice articles are in there. I am very pleased that mine is included. Of course I am also involved in 2023 (PDF version) and have just sent 4.50 Euro via PayPal. If it permits my time, I will write again an article.

Super Stefan, on the one hand we are pleased if everyone stays with it and on the other hand if he also still participates. I think also you know it, but I refer again to the possibility pointed out at the beginning of the booklet to finance the subscription with articles even completely, particularly with PDF. With three articles in the year one has collected more than enough points that one does not have to transfer money at all. We still profit from this, because if no one writes articles for us, there is no magazine. We will never be able to fill the magazine alone. So thank you!

A mail from *Horia Hancu* from Bonn went to Mirko:

I live in Bonn and I am looking for a Spectrum +3 repair shop to refurbish and check the unit. Where can I find such a person or who can help me to see what changes have been made to this model (an SD card holder, including the card, looks out of a small slot cut into the back of the computer. I also need a suggestion for changing from 3" to 3.5" (external) or a Gotek SD emulator (internal). Thank you in advance for your reply.

Hi Horia,

nice to see Spectrum enthusiasts with different ideas finding our site. Let's recap, a presumably Romanian(?) user living in Bonn owns a (modified) ZX Spectrum +3, stumbles upon our homepage and writes to us in good English - did I understand all that correctly?

Sorry if not, but I have a certain connection to Romania ;)

Before I will help you with your question, I would like to make you an offer: We publish a modern magazine that offers something interesting for every spectrum. So if you find an interesting answer to your question, let me hear from you, write an article (language and length don't matter) and you will get an issue for free. Until now I didn't know that someone exchanged the 3.5'' drive for a floppy emulator.

Also, the question about reviewing the +3 would fit in our Spectrum magazine, maybe others are interested in it, or maybe someone can help with it (who knows more, please contact the editors!).

I have to say, the +3 is more than a normal ZX Spectrum and unfortunately beyond a normal Spectrum in some respects, so it was never on my wish list. But yes, if you already have it and you like it, you should enjoy it!

The idea of a built-in floppy drive, or now a floppy emulator, is very, very nice indeed. Me and my +2 have a lot of equipment and cable clutter on the table, that was never a good example or even fun, especially when it comes to wiggle contacts! Having all that in one box must be a dream!

So maybe you'll give me the idea of having a +3, the other perfect modern way would be a Spectrum Next.... We'll see.

I did a quick search on your idea and actually found something, but I don't know any of these guys (Thomas might):

Check this out
https://www.retropassion.co.uk/product/zx-spectrum-gotek-drive/

And this guy sells such things from Offenbach/Germany, maybe he makes them himself (can't really say):

monotanz.de
gravedraq@hotmail.com
https://www.ebay.de/itm/164639750224?var=0&mkevt=1&mkcid=1&mkrid=707-53477-19255-0&campid=5338268676&toolid=10044&customid=Cj0KCQiAyracBhDoARIsACGFcS5BVDNNwtaGmdzu972ja4FwNiJrMFkHkpcVsNbRhVJU-htj9ciz39saAsGGEALw_wcB

With kind regards,
Mirko.

Matthias Goldisch from is new with us and has a question about the disk:

Moin Thomas,

thank you for the sending, which reaches me today, but there is a question: is the booklet disk basically not enclosed? Greetings, Matthias

Hello Matthias,

The booklet and disk are produced independently of each other. There were three issues of the paper mag a year, but only one disk. If the disk happens to be released at the same time as an issue of the paper mag, it is shipped together. This was the case this time with the English issue. The German magazine was ready before and we didn't want to keep you waiting. The postage in Germany is fortunately not as high as abroad. By the way, this was the last disk, so in the future there will only be the magazine.

Paul Young writes to us from Weybridge/UK:

Hi Thomas

I discovered SUC Session last year when you posted an update in the Opus Discovery Facebook group. I found it interesting, informative and entertaining. I am glad that Simon Goodwin will be joining your editorial team as I remember his journalism in the 80's and beyond. The article on the mechanical joystick made me smile as I had a rather flimsy version in the early days of my 48K with rubber buttons. I think I had bought it to use for Flight Simulator. Unfortunately, it broke pretty quickly.

After 35 years, I returned to the Spectrum world with a KS1 Spectrum Next. Initial prob-lems caused me to have my old Spectrum's refurbished so I could verify that my old interfaces worked properly on a real Spectrum.

Things escalated! I now have four 48K's with rubber keys, two Opus Discovery's, three Interface 1's, two Microdrives, two vDriveZX's, two Interface 2's, three ZXC4 programmable ROM cartridges, two ZX printers, two Timex Sinclair printers, a Stonechip keyboard, and a Swift floppy drive set up and running. Yesterday I unpacked one of my two Toast racks (Spectrum 128k) and sent it for refurbishment!

I have so much ZX equipment because I bought a huge box of "spare parts" for my original equipment at a flea market in the late 1990s. At a price of £25, I couldn't resist. Thirty-five years later, as I rummaged through my attic, I came to the conclusion that the only way I could keep this stuff was to make it work and use it. You can see some of my equipment in action on my non-monetized YouTube channel https://www.youtube.com/@PaulYoung99.

I bought my 48K rubber stopper in 1982 when I was 22 years old, as Clive Sinclair intended-"so people would learn about computers." As an adult, I wasn't particularly interested in "arcade games," so my perspective differs from those who were bought a Spectrum by their parents as a teenager or younger. I saw my Speccy as something serious, but never became a technician, just an enthusiastic "end user". Today I am exactly the same, but with a focus on doing things I didn't get to do back then.

I'd love to write about the equipment I have and the things I've done to make the most of it, but I can't say much about gaming or programming.

If you are interested in me writing something along the lines I suggest, please let me know.

Thank you for your significant contribution to the Spectrum world.

Sincerely, Paul Young

Hi Paul,

thanks for the praise, although I don't consider our contribution to be very large. We are still strangers to the majority still large Spectrum community after 30 years and so we make little impact. At least in Germany, the Spectrum User Club has a certain importance, even if only among a small group of fans of a British home computer. Anyway, we don't do it for money, for fame or honor, but for fun. You must have been joking when you asked if we would be interested in doing an article on your hardware. Of course we did, and I know you've already sent a first article in the meantime, which I also really like. Keep up the good work!

Thomas

I can only agree with that. I watched one of your videos on YouTube and was really impressed. And of course I am happy that you have joined our community. We can really use all the help we can get. Stay tuned! I look forward to your articles! Joachim

Lothar Ebelshäuser from Kall-Scheuen/D also regrets the end of the Scene+:

Hello Thomas,

today I received the Scene+. I told you the other day that I think it's a pity that this great series is ending. But the last disk is absolutely great. Normally, it always makes you want to make the next disk. Although I can understand your reasoning. All right.

Hello Lothar, don't worry, the gained free time will be used well. Maybe there will be more user-meetings, a better internet presence with all SUC-Session and SCENE+ issues for download, travels, thicker magazine... we will make sure that you don't miss the SCENE+ too much and if you do, we will give instructions in the magazine how to convert programs to floppy disk by yourself.

A letter to the editor has reached me, Joachim, via the Tlienhard Forum, which I do not want to withhold from you.

Sent: 12.01.2023, 18:42

From: ZX-Heinz

Recipient: Joggy

Your booklets contain occasionally very, very nice BASIC gimmicks, which I would like to try of course. Typing is out of the question! So I scanned everything as jpg, loaded it into a Word file, saved it as pdf and sent an OCR over it with Acrobat. Then you get a text file, which is 90% ok. But the use of Courier causes that 1 and l and 0 and O are not well distinguished. Here one must correct. If you have the finished txt-listing, you continue with bas2tap.exe to a TAP-file, and finally you can load it into the Speccy or the emulator. I have already found many nice pro-grams like this at your site. But: The Courier listing looks good in the booklet, but makes OCR big difficulties. Should I think about another font, or is there a better way to make TAPs out of your forms?

Hi Heinz,

You don't need to type the listings. If you mark and copy the listings in the PDF file, you can correct them in a text editor. The correction is necessary under circumstances, because it can be that the commands belonging to the program line are in the next line. You just have to put them on one line. If you copy the text back to the clipboard, you can simply paste them into BasinC.

This works fine. I do it the same way.

However, this is true for Windows. But if you use Linux or AppleOS, it will probably be more complicated. I myself am a disciple of Bill Gates and have only a rudimentary knowledge of the Apple OS and Linus. However, there is pretty much everything under Linux.

Alternatively you can send me a mail(!). I usually test the listings and have them as TAP on my computer. Just dare

Greetings, Joachim

NEWS IN SHORT

CRASH RADIO

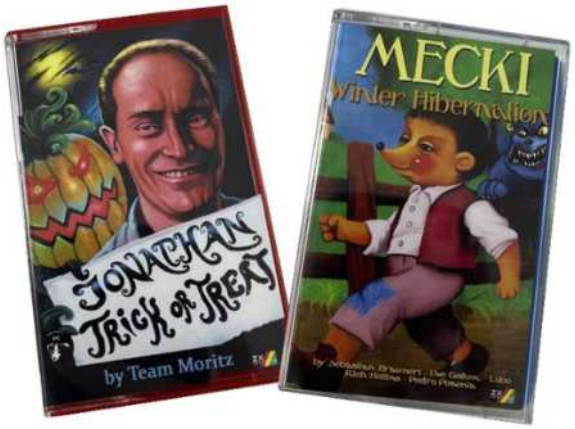
A radio station that plays Spectrum music all day long? There is such a thing. Ok, only on the internet, but still. At **https://crashradio.org.uk** you can be musically entertained. Have fun!

"ALIEN NEOPLASM" FOR SPECTRUM NEXT

Sanchez Crew has released their hit "Alien Neoplasma" for the Spectrum Next after the Spectrum 128k version (already presented here). The game has of course the same class as the 128k version, but is graphically enhanced and also has some extras. But the best is: you can download it for free:

https://zxonline.net/game/alien-game/

SINTECH GAMES



More and more games are published at SINTECH. This is mainly due to the cooperation with *Sebastian Braunert*, who is of course the ideal partner due to the close proximity in Stuttgart and who has also been quite busy. All games including the new releases **»JONATHAN TRICK OR THREAT«** and **»MECKI WINTER HIBERNATION«** at

https://www.sintech-shop.de/retro-atari-commodore-sinclair-etc/sinclair/spectrum/neue-software

CRASH LIVE 2023

After the great success of the **CRASH LIVE EVENTS 2022** (with about 600 visitors surely the biggest event for the Spectrum in more than 30 years) it will be repeated. *"CRASH LIVE 2023"* will take place on November 18 at Holiday Inn Hotel in Kenilworth, Warwickshire. Tickets will be available for purchase soon, but since overseas visitors need to plan early, it's a good idea to start looking into travel right away. News will probably be posted on Facebook first:

https://www.facebook.com/groups/1834975080096034

SPECTRUM GAMES AS DISASTER RELIEF

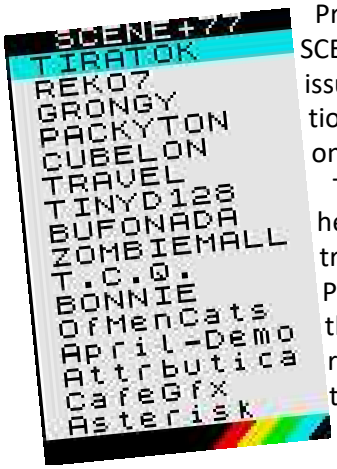
To raise funds for earthquake victims in Syria and Turkey, Ko-Fi has released a collection of Spectrum games. The proceeds will go to the earthquake victims. The games in question are Roust, Asteroids RX, Chez Maxime, Nixy the Glade Sprite, and Nixy and the seeds of Doom. All of the games have never been released on cassette before. There are both the digital download and real cassettes plus download available for purchase. Available here:

https://ko-fi.com/s/5ded3488f8

KLAUS BARTH DECEASED

You don't always find out when a club member passes away, sometime you don't hear anything anymore, the membership fee is not paid. You never know what happened. In one case, however, we have certainty, since the widow informed us: on January 2, our long-time member and reader Klaus Barth passed away. Unfortunately we had only little contact now and then by e-mail. Our condolences go to the relatives. His Spectrum stuff will be picked up and offered at a Spectrum user meeting. Thanks again to his wife Gabriele, who made this possible.

SCENE+ 77



Probably you all know, that the SCENE+ was discontinued with issue 77. Here is some information about the last, in my opinion very successful issue.

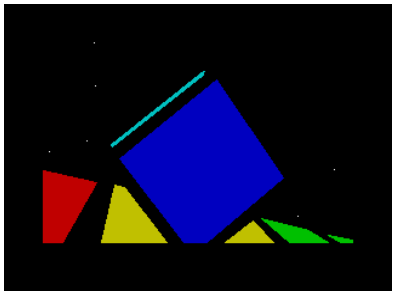
The SCENE+ was first published in 1996 by the ASC (Austrian Spectrum Club) for PlusD/Disciple only and was then taken over by our Spectrum User Club together with the entire ASC. At first, Leszek Chmielewski, the founder of the ASC, also continued to create the disc for +D, we took over the creation of MB02+ and Opus Discovery versions. This was still done on the original machines, on MB02+ Omega had created a programme for us to copy +D disks. Roelof Koning had provided the same for the Opus Discovery. With the takeover by the SUC, however, a certain time pressure arose, after all, we produced a magazine every month (later bimonthly) and this was always to be produced together with a diskette. This was too much for Leszek and Mirko, who took over this task from Leszek, could not adapt to this rhythm. The pro-

duction of such a disc magazine is too time-consuming. After a few years in which only a few issues appeared, we agreed that the disc should only appear once a year. The last 3 issues were produced by me alone, but I noticed that there were only a few subscribers who wanted real discs. Most subscribed to the magazine as a TAP version, probably because one had to take some version and TAP is the cheapest. However, the TAP version for emulators is more of an add-on, a by-product of the MB02 version. But this TAP format does not fulfil the actual idea of converting programmes written for cassette to disk. So we decided to discontinue the magazine altogether.

»TIRATOK«

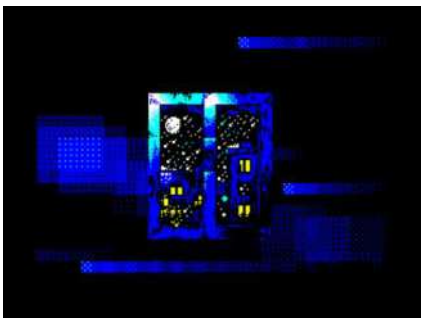
It's not entirely new, but has been somewhat lost in recent years. This demo by deMarche won the "Cafe" competition in 2019 and I would rate it as the best ever made. Therefore an absolute "must" for this last edition. Fortunately, deMarche made the job easier and created a TAP version that doesn't need any complex loaders and could easily be converted. 128k only, of course.

»REKO7«



You need some patience until the demo starts. This is because the whole breathtaking effect is calculated first. This way the effect only costs 4k. Such a memory-saving solution belongs on our disk. Here, too, it was hardly necessary to create a disk version.

»GRONGY«

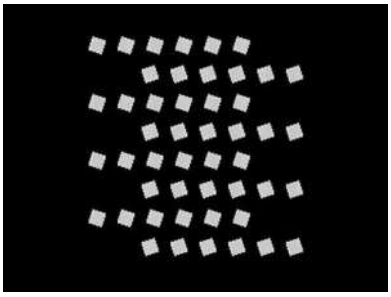


Less a demo than a slideshow of pictures, Grongy shows what he can do. Fortunately there were no difficulties in creating this version.

»PACKY TON ZED«

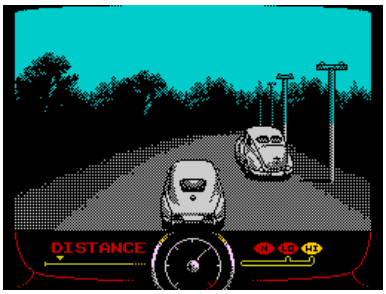
A music collection by Penisoft (please pronounce correctly). Well-known pieces of music were interpreted and there are even 2 hidden parts (read the scroller at the beginning, then you will find them). The version was memory-optimised by me, i.e. I used a packer.

EXCLUSIVE-CONVERSION FOR SCENE+: »CUBELON«



Interesting newcomer group with a demo for the theme "Cube". Very good effects. Unfortunately the demo had a special loading routine, but our magician Stefano did a good job.

EXCLUSIVE-CONVERSION FOR SCENE+: »TRAVEL THROUGH TIME VOLUME I: NORTHERN LIGHTS«



Thanks to Zosya for the permission to use her products, which are still available for purchase at www.zosya.net.

Travel through time is probably the best car racing game ever on the Spectrum. You'd think in this day and age you'd need more powerful computers for a car racing game, but Zosya proves otherwise. Zosya used the whole memory for this 128k game, but Stefano managed to do the same for +D and Opus.

TINY DUNGEONS

A kind of action/roleplaying game, you develop your character and unlock other characters, each with their strengths. An entertaining game for 128k.

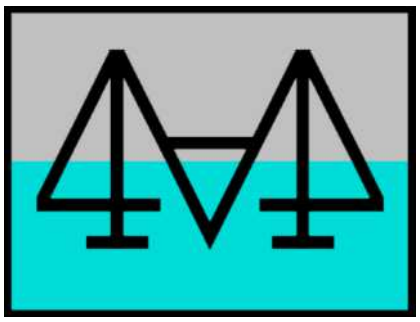
»BUFONADA«

Imagine you're a wizard and you're supposed to save the world, but the only magical help you get is.... a billy goat. Very clever game where you have to use both characters correctly. The game starts the AY sound in the opening credits and has refused to change anything after that. Fortunately it just runs like that, for Opus you have to use "noRaM" of course.

»ZOMBIE MALL«

Being locked in a department store with zombies is nothing new. But do you really want to get out, there are more zombies out there. Well done action entertainment. The game has been slightly memory optimised by me.

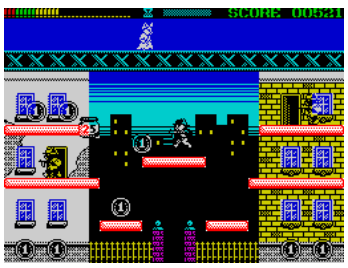
»T.C.Q.«



Triangles, circles and squares... at first the game seems like a colourful collection of Colourclash, but it is tricky and fun. Similar to Bufonada, the AY sound starts after the loading screen and the further code could not be changed. Therefore, "noRAM" must be used for the Opus here as well.

EXCLUSIVE-CONVERSION FOR SCENE+: »BONNIE AND CLYDE«

The gangster couple strikes again, but nobody knew it was cats. Typical arcade game with a nice 128k sound. But it was exactly this sound that caused us problems during the conversion, because the game checked whether a 128k computer was available and then loaded the sound part into the additional memory. Since the game also uses the entire 48k memory, this was not possible. In the end, Bob Fossil created a version that loads the sound first and then the game. If there is no 128k, the game simply overwrites the sound and it starts without AY sound. A good conversion for disk.



The Opus disk is thus almost exactly filled with 720kB. Since the MB02+ floppy still has a lot of memory left, we have added the following programmes:

»OF CATS, MEN AND ABSTRACT FIGURES«

Scene demo of Stardust with many coloured effects (128k). Has custom-loader and could not be converted to Opus/+D yet.

»APRIL«

Somewhat dark picture show, imported from TR-DOS and prepared for conversion to +D/Opus, but due to lack of memory only in the TAP version. But can easily be copied to disc

»ATTRBUTICA«

Extensive megademo of the association of Polish spectrum coders (Speccy.pl). Has not yet been implemented for +D/Opus.

»CAFE GFX«

Slideshow with graphics presented at the Cafe competition. The programme is completely ready to be copied to +D/Opus or other disc systems, but it has not been taken to these versions due to space limitations.

ASTERISK

A demo of a somewhat different kind, good effects, somewhat gloomy sound. TheSuper has stood for very good demos for years, but we were still able to optimise the whole thing in terms of storage technology and convert it to +D/Opus. For reasons of storage space, it was not included on these versions, but it can easily be copied over.

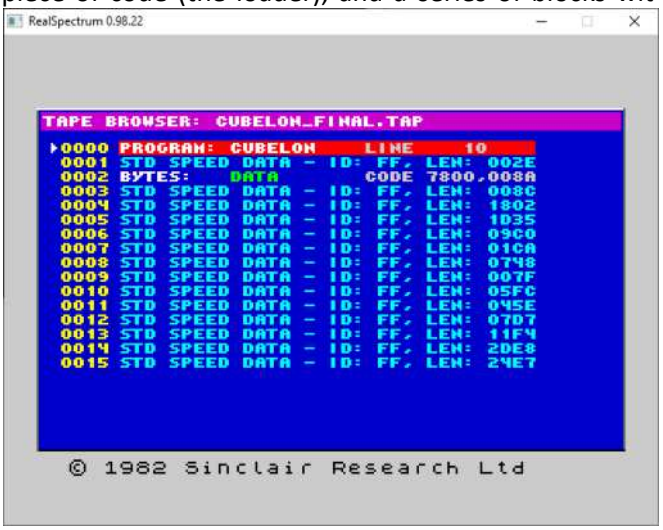
So that´s it, the last issue after 26 years. But it is not the end, because it was fun to make the programmes. We will create a section on our website where you can download all SCENE+ editions and we will certainly find space for new implementations, which you can then copy onto real floppy disks yourself. We will write about how to transfer programmes in our magazine and if you have any questions, please feel free to contact us.

If you don't have the issue yet, you can get both the TAP file and real disks from us at any time. For all those who already have the issue, we wish you a lot of fun from the entire SUC team with the SCENE hackers Stefano, Omega and Bob Fossil.

HOW TO HACK A PROGRAM: CUBELON

In the latest issue of SCENE+, one of the included demos is CUBELON. This demo had a special loader and therefore could not simply be copied to disk. Our hacker Stefano rewrote the loader to load from Basic. He gave us a short explanation of how he did it:

I started to examine the tap - layout: BASIC, a short piece of code (the loader), and a series of blocks without headers:



The entry point of the loader is at address 0x7800 (30720): If you set a breakpoint at this memory location, you can see that HL is set to the beginning of a table:

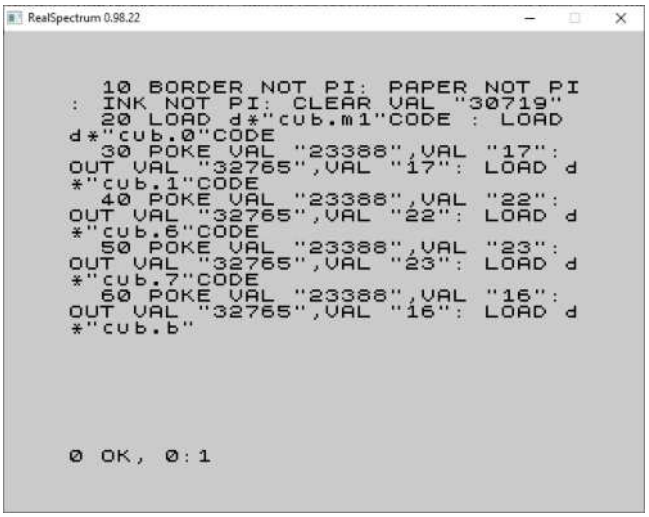
Each entry in the table is 5 bytes long and is structured as follows: RAM page number (1 byte), block start address (2 bytes), and block length (2 bytes). A loop has been entered that runs until page number 8 is read from the table. In this case, the code jumps to the demo entry point (0x7D00 - 32000), otherwise, it performs a page change and sets up IX and DE to call the default ROM loader.

Here is the table:

RAM page	Start address	Length
0x00	0x6000	0x1800
0x00	0x7900	0x1D33
0x00	0x9640	0x09BE
0x00	0xC000	0x01C8
0x00	0xD006	0x0746
0x00	0xF988	0x007D
0x00	0xFA06	0x05FA
0x01	0xC000	0x045C
0x01	0xF815	0x07D5
0x06	0xC000	0x11F2
0x06	0xD200	0x2DE6
0x07	0xDB00	0x24E5
0x08	0x0000	0x0000

If you set a breakpoint at 0x053F and use the above information, you can output all the blocks as .BIN files shortly after they are loaded.

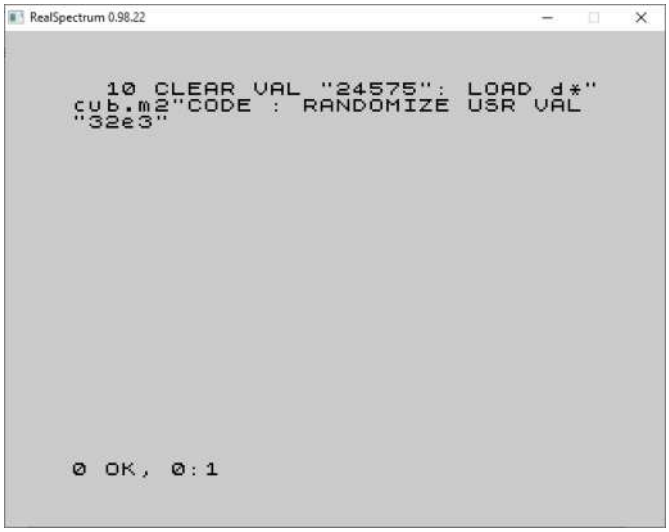
Now to the main BASIC loader. To keep all the LOAD instructions in BASIC, you have to keep a fairly high RAMTOP, so you have to delay loading the first block; CLEARing at 30719 (0x77FF) allows you to safely LOAD all the other blocks without worrying about RAM paging, then you can load another small BASIC loader that lowers RAMTOP enough to load the block with the lowest address. Since we're loading from disk, I decided to get rid of the small blocks and group them into



6 macroblocks: one for all data from 0x7900 to 0xBFFF (cub.m1), one for 0xC000 to 0xFFFFF page 0 (cub.0), one for page 1 (cub.1), one for Rampage 6 (cub.6), one for Rampage 7 (cub.7), and finally one for the 0x6000 block (cub.m2).

For the main BASIC loader, the following listing resulted:

The second BASIC block (cub.b) CLEARed only simply on a different address. Then the last block is loaded on address 0x6000 and the demo is started:



That's it, modern emulators (like here the REAL SPECTRUM EMULATOR) make it easier and faster, viewing and loading can now be done from Spectrum floppy disk (Opus, +D) or Microdrive.

TRAVELING WITH THE SPECTRUM USER CLUB

BY THOMAS EBERLE

At the Spectrumania in Wittenberg we talked about visiting the ZX LOAD Museum in Cantanhede/ Portugal.

We had planned such a trip for the end of January, but only a few (2) users showed interest. That is of course too little.

Since I think it is a great idea to organize such Spectrum trips, I would like to ask all users in general: Should we continue to try to plan such trips or is there generally no interest? There would be enough possibilities: CRASH-Spectrum-Show in England, Forever-Demo-Party in Slovakia or the museum in Portugal.

My suggestion would be to plan it with enough lead time, here is a set of possible dates:

- Crash Spectrum Show in England: date probably in late fall 2023, travel via London to Birmingham and back. Possibly can be planned with 1 day stay in London, entire weekend or a few days longer.

- Visit LOADZX Museum in Portgal, visitable all year round, date suggestion would be spring 2024, when it is already somewhat warmer in Portugal, but not yet hot. Duration min. 5 days with visit of Porto and Lisbon and some days relaxing at the sea.

- FOREVER demo party in TRNAVA, Slovakia: The only demo party in the world that is firmly in Spectrum hands. Flight over Bratislava with sightseeing, then 3 days demo party, with stay in Trnava with possibility to visit several historical buildings.

The trips will be made in such a way that there are not only computer themes, so it is suitable for the whole family.

In the end we can plan everything, we should first know if there is general interest. Then we can set a time together and go to the more detailed planning. Everyone can have a single room or a larger room with family, it's all feasible. Please give me feedback on this, generally also how you find such actions, which we can then plan more often. I would also be happy to receive other suggestions for events in Italy, Spain etc. Your answers please send by email to :

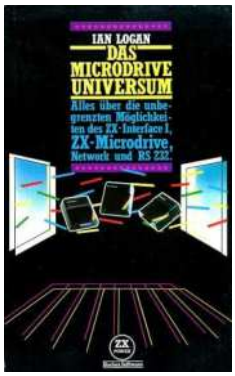
thomas.eberle@sintech-shop.de

BOOKS
BY JOACHIM GEUPEL

In the last part of the presentation of the ZX Spectrum books in my Retro Computer Library, I present you the last six books. I actually only presented the books that I have as books and not the ones that can be found on my PC as PDFFile. Some of the books I have presented can be found on the World OF Spectrum website at "https://worldofspectrum.org/archive/books", others I found during my search for documents in other sources.

Of course, there are other books in my library, but these deal with other computers from the home computer era of the 80s. However, these do not belong here unless there is interest in them.

»THE MICRODRIVE UNIVERSE«
BY IAN LOGAN



Hueber Software,
1st edition 1984,
136 pages, ISBN 3190083444
English original title:
Spectrum Microdrive Book, 1983,
Translated by Martin Görlitz

Dr. Ian Logan has published a number of books, including The Microdrive Universe. He explains pretty much everything to do with the Microdrive and Interface 1. The book itself is in good condition even after almost 40 years. Of course, the edges of the pages have yellowed, but the binding is still fine and it still doesn't throw its pages off.

In Chapter 1, he introduces the ZX Spectrum system with Interface 1 and Microdrive and explains how they interface with the ZX Spectrum. He goes into the RS232 and describes in short words the local network. On four pages the switching from the SystemROM to the ShadowROM is explained and how the switching is triggered.

Chapter 2 describes the new Basic commands and how to use them. This is all described in the Interface 1 manual.

Chapter 3 deals with the Microdrive itself. In an extensive section, the recording format of the tape data to the cartridge is explained with the help of some drawings, as well as the formatting of the cartridge, the execution of the CAT command, and the deletion of data. The channels, i.e. the "streams" are explained as their application. Some short example programs complete this explanation.

Chapter 4 describes the local network. With this feature, which unfortunately hardly anyone uses, Sinclair Ltd. tried to introduce a standard, but it did not catch on. Ian Logan goes into detail about the topography and application of the network. Some graphics, as well as short example programs, complete the explanation. Described are, of course, the network itself, the station, and the station number. Short programs explain the sending of programs, data, and screens.

A quite extensive part describes the data format the network works with and how it is constructed. This description is very densely packed with information, but Ian Logan has made an effort to convey the explanations in an understandable way.

Finally, chapter 5 describes the RS232 interface. This chapter is relatively brief and describes the RS232 line, how to set it up, how to use it, and in what form. The data format is described as how the sending and receiving of text and binary files work. Again, there are graphics and short programs to illustrate everything.

Finally, chapter 6 explains how to incorporate machine language. Here Ian Logan points out that it is useful to be familiar with programming in assembler. In two relatively large sections, it is explained how to use the "append commands", i.e. the call of the shadow ROM. In the second section, he describes how to make your own commands using an assembler. I myself was only marginally interested in this, although the description of how to program your own commands has its charm.

The book is rounded off with an extensive and well-organized index. Here most of the topics are listed again as keywords.

The book is unfortunately, like all books I present here, only available antiquarian. For those of us who are more interested in Microdrive and the possibilities of Interface 1, a search on the web might be worthwhile. On "World Of Spectrum" unfortunately only the cover of the English edition can be found. The English edition is available at

https://ia601400.us.archive.org/28/items/spectrummicrodrivebook/SpectrumMicrodriveBook.pdf

can be found.

»THE SINCLAIR SPECTRUM ROM«
BY R. ARENZ AND M. GÖRLITZ

Max Hueber Publishing House Munich,
1st edition 1984,
214 pages, ISBN 319008209X

This book is one of a series of books introducing and explaining the disassembled ZX Spectrum 48 ROM. The introduction tells the prehistory of the book, which is admittedly quite adventurous. A disassembler was available on a ZX81. By an additional circuit, the SpectrumROM was

read out, transferred to a Commodore CBM 3032 via a computer linkage, and stored on a floppy disk. An assembler on the CBM was used to edit the listing and compare it with the original ROM. In the course of disassembling and editing the ROM, a printer interface for the Spectrum was created, which understood all print and output commands and even allowed hard copies of the screen.

On the first two pages, the system variables with their address range in RAM are briefly named. Finally, on the second page, the listing starts. It is divided into four columns. The first column contains the ROM address, the second column shows the source code in HEX, the third column contains the mnemonics, and the fourth column contains the explanations for the respective line.

The whole listing is continuously broken down into the function blocks of the whole system. For example, starting at line $0038 you will find the interrupt routine, starting at line $0095 the BasicStatements, and starting at line $028E the query routine of the keyboard. Depending on the importance of the individual sections, the block is separated from the rest of the listing by a line of equal signs "=", or in the comment, three lines, each with the same line number, are separated by a semicolon.

My personal conclusion about the book is simple. You need it or you don't need it. For assembler programmers who want to move around ROM, it is certainly very useful. My time programming assembler, preferably that of the 80C535, has been over for a while. But for me, it was still interesting to see what the individual blocks look like, where to find them, and what they do.

Right off the bat, I found a few sites on the Internet that offer the same thing as the featured book. One of them is

https://k1.spdns.de/Vintage/Sinclair/82/Sinclair%20ZX%20Spectrum/ROMs/zx82%20Standard%20Rom/The%20Complete%20Spectrum%20ROM%20Disassembly.pdf.

Likewise, for example, ROM 0 for the ZXS 128 toastrack can be found immediately. So if you are interested in the complete listing, you only need to enter the corresponding keywords in any search engine.

»ZX SINCLAIR SPECTRUM TIPS & TRICKS«
BY PETER BOSETTI

Data Becker Publishing, 1985,
211 pages,
ISBN 3890110754

Blurb: "Dr. Peter Bosetti is a physicist at the University of Aachen. Waiting times at the mainframe brought him to the Sinclair ZXSpectrum, which fascinated him so much that he published his experiences, ideas, and tricks in this book."

I can't say that I really like this book. The contents, at least as they are written on the blurb on the back cover, are promising. For example, the connection of a Lightpen is also presented there. However, there is no schematic for this in the book. This book is a collection of user programs like word processing, clock, calendar, the inevitable biorhythm, and some other programs.

Chapter 1 gives general notes on the Spectrum, actually what you can read in almost any book on the ZXS.

Chapter 2 gives tips u for effective programming. Here you can read about structured programming, interception of wrong inputs, and memory-saving programming.

Chapter 3 deals with the Spectrum's memory. Here it is shown how to read the memory and write something into it. Two pages deal with the system variables. These descriptions are easy to understand - obviously, the author has experience in teaching. Followed by the system variables are a few tips like clearing the screen by calling the routine directly in ROM via RND USR 3435.

In Chapter 4 there are some useful programs like double size font and 64 characters per line. If you want to play Mastermind, you can copy it here.

Chapters 5 and 6 introduce two extensive programs, each filling a few pages in the book. Both chapters explain how the respective game works and how it was developed. You can pick up quite a bit in programming techniques here, which I find quite useful considering the programs I've already seen.

As for chapter 7, I'm not so sure what to make of it. It was quite useful at the time the book was published, as it reintroduces Interface 1. The author thankfully keeps it very short here. He describes in short words the connection between a serial printer and a lightpen. In both sections, only the functionality is presented. For example, the circuit diagram of the Lightpen is missing - apart from that, a Lightpen of this type does not work on modern TFT screens anyway. A word processor, whose printed listing extends over four narrowly printed pages, was probably quite useful for those who didn't have the then-common Tasword II.

The chapter concludes with an explanation of what a compiler is.

Chapters 8 and 9 deal with programs for the graphical representation of data. Again, long listings have to be copied to display the data as bars and pie or pie charts.

Finally, Chapter 10 deals with Spectrum in small-scale operations. Here, the development and use of a customer file and a warehouse/sales management program are explained. Again, long listings are printed for copying.

The book ends with a short description of all commands and a list of possible error messages of the Spectrum 48 with connected Interface 1. I find both appendices quite useful because they are again kept short and understandable.

The book can be found on the website of the Internet Archive and can be downloaded here as a PDF, among other things:

https://archive.org/details/zxspectrumtipsundtricksocr/page/n3/mode/2up

»MUCH MORE THAN 33 PROGRAMS FOR THE SINCLAIR SPECTRUM«
BY R. G. HÜLSMANN

Hofacker Publishing House 1983,
138 pages,
ISBN3-878963-144-4

Here I will keep it short. In the book are actually more than 33 programs for the

ZX Spectrum, namely nearly 54, if you count all example listings.

In Chapter 1 there are tips and hints, for example, tips for saving memory, reducing the number of lines, and program optimization by combining variables. It is shown how to modify the Spectrum, e.g. to add or plug in new controls.

Chapter 2 lists 10 game programs for a 16kB Spectrum and in Chapter 3 there are assembler programs that can either be included as subroutines or run independently, e.g. a hex loader.

Finally, chapter 4 contains the "Super Programs", such as an LP register, a card index program, housekeeping, moon phases, biorhythms, and some more sophisticated games, such as "Crazy Kong" and "Quadro".

I have, to record my records, entered the LP register. This program is still on cassette somewhere and was quite helpful for a while. But further development of just this program pushed the Spectrum to its limits, so I decided to get an Atari ST in 1985.

I like this book very much. I enjoyed working with it, especially Chapter 1, and I learned a lot from the LP register. This book can also be downloaded as PDF, this time on "World Of Spectrum" at

https://worldofspectrum.net/item/2000554/

can be downloaded.

»ZX SPECTRUM HARDWARE«
BY REINHOLD EGELER

Markt & Technik Publishing House
1985, 144 pages,
ISBN 3-890-092-5

This book was the first book about the hardware of the ZX Spectrum I ever bought. At some point, when I wrongly assumed that I had nothing more to do with the Spectrum, I sold everything, and with it the book. However, when I rediscovered the ZX Spectrum, I regretted that very much; just as I regretted selling my two ZX Spectrums. But that's another story.

Reinhold Egeler has written one of the best hardware books on the Spectrum available anywhere. He deals extensively with the construction of the computer and goes into detail without getting lost in unnecessary details. He has a pleasant and easy-to-read style that makes it easy to understand what is going on inside the computer and how it works.

Chapter 1, which is divided into nine subchapters, describes the technology of the ZX Spectrum 48. The author bases this on the board versions of Issue 2 and Issue 3. He first explains the basic structure of a microcomputer and then starts with the Z80 processor. He explains the memory and ROM, goes into detail about the ULA, describes how to query the keyboard, as well as explaining the output to the screen. The Edge Connector, which he refers to here as the contact comb, divided into top and bottom, is described in detail but concisely. The description of the power supply doesn't end with the power supply but continues with the voltage generation, starting with the voltage regulator. The generation of the +12V is explained as well as the generation of the two negative voltages that the computer needs for the RAMs. The chapter concludes with a troubleshooting guide indicating possible sources of error should the ZX Spectrum ever go on strike.

Chapter 2 explains how to connect a Z80 PIO to the Spectrum. The address decoding is described before the Z80 PIO is presented. Here also the circuit diagram is not missing, although I missed the layout for making a board.

Chapter 3 is the most extensive chapter of the book. In it, the different modes for programming the PIO are described, as well as its structure. Of course, the input and output of data via the ports of the PIO are not missing. A small circuit is presented, with which LEDs can be controlled, as well as a circuit for the output of

values via a seven-segment display. Another circuit, a modification of the circuit for driving LEDs, shows how 5 V relays can be driven.

Subchapter 3.5 starts the section in the book that contains descriptions and the associated circuits that can be connected to the Z80 PIO. The chapter describes the construction of a software-controlled hardware clock whose IC, an M755, is apparently no longer available. The author explains how to program the clock IC and presents both the schematic and the necessary layout, albeit scaled down. A comprehensive program for programming the clock, which is battery buffered by the way, is of course not missing either.

In subchapter 3.6 a sound generator with the well-known AY 3-8912 is presented. Again, the IC is described and an equally extensive program with an almost endless list of numbers containing the assembler program is also included.

Finally, subchapter 3.7 describes the programming of the PIO. The author gives hints on how to program the PIO from Basic. He explains the use of the "IN" and "OUT" commands and shows how to apply them to the PIO. Further on in the chapter, he explains how this is all done in assembler. This is followed by a short Basic listing that places an assembler program in memory. This can then be called with a RANDOMIZE command.

In the last chapter, Chapter 4, a stand-alone board is presented that contains an A/D converter that operates independently of de3r Z80 PIO. This A/D converter of the type ADC 0817 can still be purchased from some suppliers, so it is available, although difficult. The ADC 0817 is described in detail, as well as its programming. The conclusion of this chapter is a program, which contains an assembler part, with which a storage oscilloscope is realized.

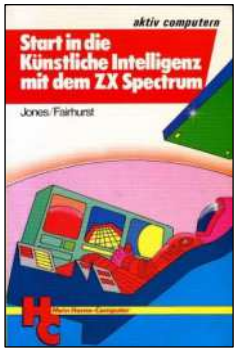
Finally, the appendix contains a keyword index, a drawing of an assembly plan, and a schematic of the electronics of the ZX Spectrum of the board version Issue 2.

My conclusion to this book is that it is really worthwhile. But unfortunately, like so many of the books from the 89's dealing with the ZX Spectrum, it is no longer readily available. My attempt to upload the book to "Word Of Spectrum" failed. Apparently, this is not possible. So I can only offer to send a download link to the person who wants to have this book if he/she writes to me.

»START INTO ARTIFICIAL INTELLIGENCE WITH THE ZX SPECTRUM«

BY ROBIN JONES & MICHAEL FAIRHURST

Vogel-Buchverlag Würzburg 1985,
192 pages, ISBN 380230862X
Original title: "Artificial intelligence:
ZX Spectrum", Shiva Publishing Limited, 1984



This book is by far the most ambitious book on ZX Spectrum I have ever had in my hands, and it is probably also one of the most ambitious. The attempt to use the ZX Spectrum as an introduction to artificial intelligence is very brave. The authors ventured into a subject that is still extremely complicated today, at a time when "artificial intelligence" still meant a tinny answering robot with antennas on its head, or at best an expert system for specific data evaluation of complicated issues. It is important to know that the original English version came out as early as 1984, followed by the German translation in 1985. At that time, research on AI was just beginning; at best, the first, albeit large, steps had already been taken. One thinks here of computer-aided weather forecasting, the first simulations of atomic bomb explosions, and systems for the automatic guidance of cruise missiles, cruise missiles that found and find their way to the target independently. The first two examples relied on vector computers, i.e., cascaded computing systems, the latter on highly specialized guidance computers that were (and are) capable of nothing more than getting the cruise missile to the target as quickly as possible. The authors leave no doubt that a system like the ZX Spectrum is not really capable of processing such large-scale tasks, let alone actually representing an artificial intelligence system. Nevertheless, they try quite successfully to convey this challenging subject in a way that is easy to understand.

The book is divided into eleven chapters. Chapter 1 clarifies what AI actually is in the first place. The introduction ends with the example of Alan Turing and the realization that AI has the goal of replicating human behavior.

Chapters 2 to 4 deal with the possibilities of pattern recognition, whether visually in the form of character recognition or acoustically in terms of speech recognition and meaningful speech output, which in turn is based on both speech recognition and character recognition.

Chapters 5 through 7 expand on these findings, taking up the aspect of learning. The authors address the importance of networks, without which a CI system cannot work properly, no matter how sophisticated the programs are.

Some of today's AI systems are "fed" with many millions of data in order to reliably recognize patterns and structures. This procedure is in its infancy here, although the authors may already have had an inkling of what today's AI systems are capable of on the basis of "deep learning". And "Deep learning" is certainly not possible without a network structure.

The topics discussed previously are dealt with in greater depth in chapters 8 to 10. Chapter 8 deals with kinship trees, "spaces" in computers, and finally expert systems.

Chapter 9 deals with "intelligent games" like "Chess" and "Othello". It explains how the games work and how they are constructed. I must confess that I reached the limits of my own knowledge here since I never dealt with the basic problems of this programming either. It was interesting to read, although the subject is conveyed relatively dryly but with great expertise.

Chapter 10 goes one step further again and explains the problems of recognizing structures and shapes. Here at the latest, our ZX Spectrum is overstrained, unless you give it a lot of time to calculate. Using the example of "thick and thin figures", the problems and the solutions to recognize such shapes are discussed.

Finally, in chapter 11, we get down to the "nitty-gritty". This is where things get complicated. Chapter 11.1 addresses biological processes and how they can be replicated on computers. 11.1 is followed by 11.2, in which "flexible neuron models" are introduced and discussed. Here an attempt is made to illustrate how a network can be structured by looking at the connections between neurons. I ask you not to confuse "the neuron" with "the neutron". A "neuron" is a nerve cell in the brain, while a "neutron" is an electrically neutral particle in the nucleus of an atom.

Finally, the book arrives at supercomputers in Chapter 12. Here it is about alternative computer structures, advanced pattern processing, and the basic structure of a "computer cell." These topics were also in their infancy in 1985. Today, both have developed so extremely that they are present almost unnoticed everywhere in our everyday life and may send us unnoticed into an information bubble in which we are only presented with procedures, videos, and events that we are supposedly interested in just because we clicked on them on Facebook and Co. out of one-time curiosity.

In the appendix, the book presents examples of pattern recognition, speech recognition, and a simple expert system in the form of a "mother-daughter" search. The programs are written in Sinclair-ZX-Spectrum-Basic and represent an almost exemplary good example of structured programming.

My personal conclusion to this book is that you must have read it or not. I am quite ambivalent about this book. It is complicated and simple at the same time. It reminded me of my training as an electronics master, subject area "analog control engineering", in which I was confronted with a book, on whose first page the remark "without mathematical ballast" stood, and on the following pages format-filling mathematical formulas of the control engineering stood, which let me doubt the truth of the first statement a few pages before nevertheless very much.

Of course, the book is no longer up to date. The research field of "Artificial Intelligence" has developed extremely since 1985. In the meantime, AI is so much more than just pattern recognition - and it is a proven fact that computers with the appropriate programs are now quite capable of passing the "Turing Test" and yet have nothing to do with intelligence, let alone artificial consciousness.

You either need this book or you don't. It reads like a lecture on AI and is didactically cleverly structured. The programs are excellently programmed and exemplary. Those who do not own the book may miss out on learning how a textbook should be structured. But not owning it is not a loss, since it covers a topic that is of rather minor importance on the ZX Spectrum.

Also, this book does not appear to be available for download anywhere. I have not put it into a PDF either. At best it is still available somewhere antiquarian.

MY SPECTRUM COLLECTION

BY PAUL YOUNG

After leaving the Spectrum world in the late 1980s, I returned about 3 years ago with a Spectrum Next. Whilst setting things up again, I have found some amazing “modern” Spectrum tools and hardware that have significantly added to my enjoyment. Hopefully you will enjoy my story of discovery, even if these things are known to you.

My first objective was to attach my old interface 1 and Microdrives to my Next, but I needed to re-felt my cartridges first. The felts had become brittle after years of storage and would turn to dust on contact. I bought new felt, a hands on device with a magnifying glass, and a razor sharp scalpel. Aided by some YouTube videos I managed to re-felt about twenty of my old cartridges. It was a very painstaking and time consuming job, pushing my sixty year old eyesight and hand coordination to the limit. I'd advise you to buy re-felted ones from eBay unless you have very steady hands, keen eyesight, a lot of patience and time to spare!

I soon became concerned that my Microdrives were a finite resource and I did not want to wear them out, so was delighted and amazed when I discovered Charles Ingley’s perfect answer, the vDriveZX. His board fits perfectly inside an original Microdrive case and plugs into interface 1 like an original Microdrive. You have to

look hard to notice it's a Microdrive using an SD Card rather than a cartridge. Being so closely integrated into the original Spectrum platform, the user experience is almost identical to the original one, plus some nice extras, like being able to create many banks of 8 microdrives on just one vDriveZX and intuitive short hand commands to use as an alternative to the Spectrum's original more verbose ones. It's closeness to the real thing makes it in my mind the best "modern" storage solution available for the original Sinclair Spectrums. It also has enormous value in keeping the Microdrive experience preserved and alive for posterity.

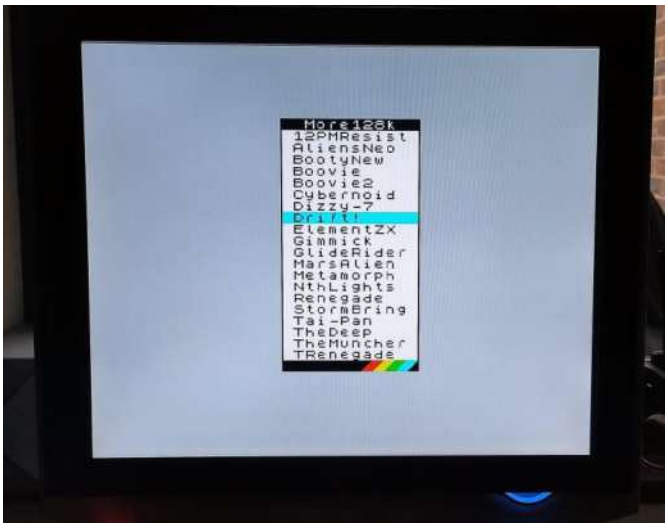
ZX Spectrum Next with Interface 1 and Microdrive

I was quickly reminded that in the beginning getting anything but BASIC programs on to microdrive cartridges was a pain. Software solutions like Trans Express, Lerm, 007 and Transformer were either very hard work, or limited in what they could transfer. I can clearly remember rejoicing when Multiface One eventually arrived. All Multiface required was a press of a button and the selection of a simple menu option to save to cartridge. It was a "game changing" device for Microdrive and other storage users, but it did have two annoying limitations. It needed to be attached to the Spectrum to avoid corruption in the software loading screen and you also had to put up with its blue "M1 Loading" screen at the beginning of every snapped program, rather than enjoy the software's often artistic opening screen graphic. I didn't want to use the Multiface software option on my Next, so I was overjoyed when I discovered a "modern" solution in Tom Dalby's "Z80onMDR".

With Z80onMDR on your Windows PC, you can create a MDR from any Z80 snapshot. It also automatically creates an attractive Spectrum128K style menu to run the programs from. If you use option -p, there is no loading screen corruption or Multiface "M1 loading" –

vDriveZX-SD-Kartenlaufwerk in Microdrive housing

Yippee! (If you wish, you can also specify a SCR of your choice as the loading screen) I can of course read the MDRs directly on my vDriveZX, but with my real Microdrive as drive 2, I can also easily copy any MDR from my vDriveZX directly on to a real cartridge in my real Microdrive. (I use the simple Clive Copy utility on my Spectrum to do this). This method has enabled me to recreate original cartridges from preserved MDRs I have downloaded, as well as those I have created myself with Z80onMDR.



Selection with »DSKTAPmenu«

Whilst setting up other old interfaces on my Next, I needed to check they worked on my original Spectrum hardware first. This led me on a path to getting all my old Spectrum stuff refurbished! I soon had my old Opus Discovery and rubber key 48K up and running. The Opus D does not have a capture to disk capability on board. You can attach a Multiface One to it, but without making a soldering modification to the Opus D, the Multiface has to sit in between the Opus D case and the Spectrum.

This height of the Multiface makes slotting in and extracting the floppy disk awkward, but more importantly to me the positioning very much spoils the otherwise stylishly flush engineered connection between the machines.

Opus Discovery with »Z80onOPDMenu«

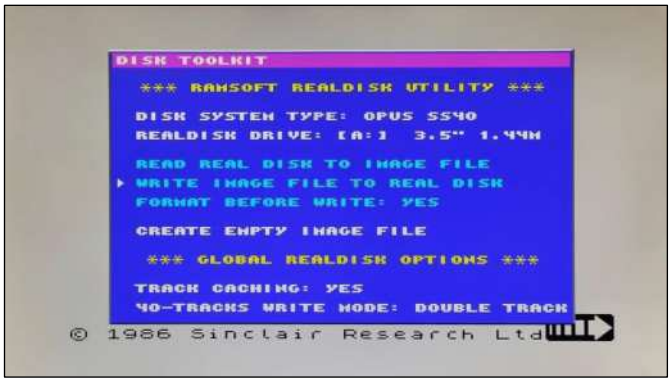
Although the Opus D has BASIC Microdrive compatibility, Z80onMDR does not write Opus OPD disk images, so I asked Tom Dalby, if he could make a version of Z80onMDR to create OPDs too? To my delight he kindly agreed to do so, and I helped him test the beta versions of what is now is known as Z80onOPD. Now I don't need to attach a Multiface to my Opus. :-)

You may now be thinking "how do I get my Z80onOPD created OPDs onto an Opus floppy disk?" To cut a long story short, I looked at setting up a Greaseweasel, but on getting one, it seemed to involve quite a lot of work. Instead, I bought an old Pentium II PC with built in floppy drive and put Windows 95 and 2000 on it. With RealSpectrum installed I can use the simple menu option it has to write an OPD image to a real floppy disk that can be read by my Opus D. (I can also use SamDisk on Windows 2000, but you use a command line and need to get the options right)

It took me sometime to realise that the best format to use on a Spectrum Next for original Spectrum programs is TAP because of the following. 1) You see full loading screens. 2) Programs that Save and Load to tape within program can be diverted to Save and Load to TAP using the Next's TAP In/Out NMI button menu option. 3) TAPs Load at near "disk" like speed on the Next, so there is no significant loading time deficit for using TAP. Exploiting these factors with another of Tom Dalby's utilities "MenuDsk", I have been able to make launching my favourite programs on the Next much easier in an original Spectrum looking way (The original nostalgic look is important for me)

With the MenuDSK TAP option, I am able to create a TAP with a 128K style loading menu for up to 20 programs. Using a standard file joiner I then join my chosen 20 program TAPS, plus the MenuDSK TAP with the required Load names on it together on one long TAP.. When you load the TAP you are presented with a Sinclair 128K style Loading menu with the names of the 20 programs you can run. As TAPs load quickly on the Next, even the 20th program on the TAP loads in seconds. (Sometimes the Load name on the original program TAP may not be a very clear as a menu identifier e.g. "program" or "game", so I first look at the loader name in the TAP using ZX Block Editor and where necessary edit the name to something more meaningful, or consistent for display in the loading menu I am going to create with MenuDSK)

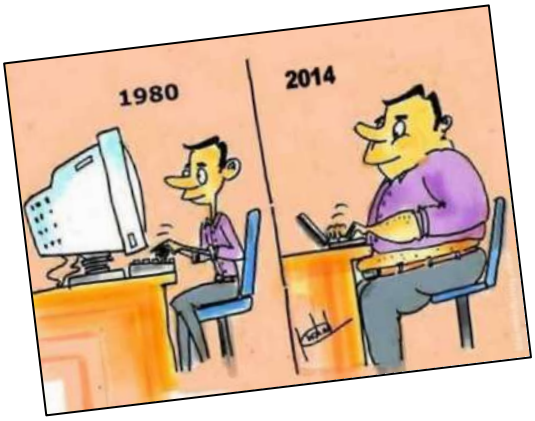
Yet another program in Tom Dalby's suite I use is Z80onTAP, which converts any Z80 into a TAP. This utility is invaluable. 1) If you can't find a TAP version of the program you want and other formats of the program won't convert properly to TAP for some reason. 2) If there is only a Z80 version preserved and you prefer a TAP 3) If the TAP version does not Load properly, you can often make your own Z80 snapshot, and convert it to a TAP which works. 4) If you want to start



your program at a different point than the original TAP start point.

If your interested in what any of this looks like in action, a lot of it is visible somewhere on monetised YouTube Channel

https://www.youtube.com/@PaulYoung99s



RECONSTRUCTION OF A ZX SPECTRUM 48K

BY BURKHARD TAIGE

PART 5

If you are not afraid of the costs, you should calculate at least a budget of about € 200 in case the parts can't be bought for the cheapest price.

But there is also the alternative to build a "Harlequin" instead of a ZX Spectrum 48K on an Issue 3B board. The Harlequin is a replica that replaces the ULA completely with standard ICs. This is available as a "complete kit" (all parts and board - except ROM IC!) in a 48K version for about € 90 and as a 128K version for a little over € 110 at www.bytedelight.com. For the ROM IC you have to add another € 20. The Harlequin has the advantage that it has an expansion bus, with which most, for the ZX-Spectrum available, additional parts (e.g. +D - disk interface, divIDE interface) can be operated. However, on these boards almost twice as many IC's or their sockets have to be soldered compared to the Issue 3b board. For some € 100 extra you can get the Harlequin completely build.

The Issue 3B board gives the feeling of having built a "real" ZX Spectrum. All problems, which are reported in the different forums, can be realized with this replica.

First of all there is the "heat problem". The voltage regulator µA7805 regulates the input voltage from the power supply, which can vary between 9V to 12 V, down to a constant 5V. However, the loss voltage is noticeably dissipated in heat - i.e. without a sufficiently dimensioned heat sink, this regulator IC has only a very short life expectancy. In the best case there will be only 0V instead of 5V - in the worst case the input voltage will simply be "passed on" and ULA, ROM, CPU and RAM ICs will do the same as the voltage regulator...

A reason why I (and many other Spectrum users) tend to the modern switching voltage regulators. With high frequency the input voltage is switched through only so far that a constant 5V is built up. The conversion of the residual voltage into heat does not exist and therefore the heat sink is not necessary.

There are these components pin-compatible in open

and in closed design

With € 5 to 10 these regulators are however clearly more expensive than the µA7805. But it saves the heat sink, which, if you don't have one from an old Spectrum, is rarely offered and then also expensive.

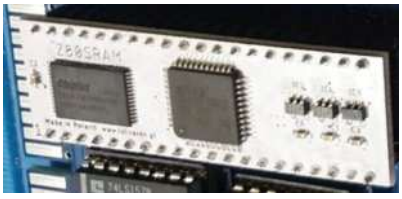
The next problem results from the construction of the ZX Spectrum. The expansion bus, i.e. the connector strip, is designed to expand the ZX Spectrum with additional modules e.g. a joystick interface. Unfortunately all data, address bus and other contacts are led out without any protection. This can cause damage to the components of the ZX Spectrum when plugging or unplugging additional modules, if the computer has not been switched off beforehand or a module is put on "crooked". Most often one or more RAM ICs are destroyed. Often there is also a chain reaction, which damages or destroys components, which are responsible for the -5V and 12V generation.

The RAM-IC's, especially the "Lower-RAMs", of the type 4116 are not produced anymore for a long time. On Chinese trading platforms you can get "new" RAM's quite cheap. Unfortunately, these RAM's are not individually tested before shipping. From my own experience I had to find out that these are rather recycled IC's, which were often re-labeled and of which not infrequently up to 100% (usually 50%) are defective! The 4116 are especially susceptible because of their multiple voltage supply (+/-5V and 12V).

Also the "Upper-RAM" IC of type 4132 are only available used or recycled. If you buy these chips from sources where you can assume that they have really been tested for function, you unfortunately pay comparatively high prices.

For the "Upper-RAM's" you can fortunately also use the types 4164 or even 41256, which were produced much longer and are therefore often cheaper to get. Actually, the 4132's are defective 4164's where either the upper or lower memory bank still works. These defective types were cheaper at that time and were simply sorted out according to whether the H or L bank still worked and thus the "half" memory could still be used. If you now use normal 4164 or 41256, it doesn't matter which bank is selected via the wire jumpers next to the MIC socket.

Another option for the Upper-RAMs is the Z80SRAM. A CPU replacement that replaces both the Z80 CPU and the Upper-RAMs. This module can be found for about € 30.



Z80SRAM module

It has the disadvantage, that it should not be put into a socket, because of the height, because then you can't close the Spectrum. So it should be soldered directly or you try to remove the plastic strips of the pin headers, so that the board can be plugged deeper into a socket.

At https://www.retroleum.co.uk/zx-spectrum-chips you can find a module for the Upper-RAMs as well as replacement modules for the ROM and Lower-RAM which cost between 15 - 20 Euro (plus shipping and import tax!).

The Lower-RAM module has already an advantage: the -5V and 12V are not needed here. The only IC that needs a different voltage than the +5V is the video IC LM1889, which is also limited available, but for which there is no replacement yet.

Another alternative for the vulnerable 4116 lower RAM ICs I will describe in the next part.

PART 6

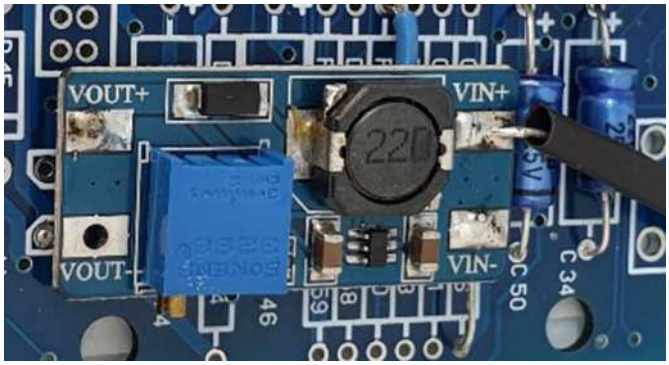
Instead of a lower RAM module, which should cost more than €20 including customs duty and shipping, you can also use the same IC that can be used as a replacement for the upper RAM. Namely 4164 or 41256! The big advantage here is that the failure rate is not that high with these types. However, a small "conversion" is required ...

First of all, the "superfluous" voltages (-5V and 12V) must be kept away from the chips. To do this, pin 1 (-5V) and pin 8 (+12V) on the IC must be bent away. Pin 9 has the +5V voltage for the 4116. However, the 4164 requires this +5V on pin 8, so a connection from pin 8 to pin 9 must be made. The address line A7 is on pin 9 of the 4164. Pin 9 can be supplied with +5V in the IC socket. This selects the "higher" memory area, ie half of the 64KB, which still leaves more than the 4116's 16KB available.

With the 4116 RAM, you will notice a noticeable warming of the IC after just 5 minutes of operation. If you put the modified 4164 (or 41256) in the sockets, you will hardly notice this.

The oscillator circuit for obtaining the -5V and 12V voltage, with the transformer coil (which, as already mentioned, is difficult to obtain) and the transistors TR4 and TR5 is quite fragile. In connection with replacing the 4116 (with a lower RAM module or 4164/41256), I came up with the following replacement circuit:

I simply omit all components in the circuit diagram of the Issue 3B power supply control needed for the -5V and 12V. According to the print on the 3b-PCB, these are the transformer coil (COIL), TR 4, TR 5, C43-C46, C49, C66, C74, C77, R54-R55, R57-R62, D11, D12, D15 and D16 . But since the LM1889 needs 12V, I install a so-called step-up module of the type MT3608 on the space now available on the board.



Stepup module MT3608

Such a part with costs under € 5 is cheaper than a transformer coil alone. It is available e.g. at https://www.az-delivery.de and everywhere where you can buy ESP32 or Arduino components. To connect it, a connection is made from VIN- of the module to the, at the board edge located solder point of C66. VIN+ is connected to the topmost solder point of the coil, located to the edge of the board (this is where the input voltage of the power supply is). VOUT+ is connected to the soldering point of R62 facing the center of the board. With the adjusting screw on the module the output voltage (VOUT+) is set to 12V. This can be done before soldering if VIN+ and VIN- are connected directly to the power supply via a socket. When the board is completely assembled and connected, you can check the voltage at PIN 14 of the LM1889 and readjust it if necessary.

By connecting the 12V module in this way, no -5V voltage is present. Pin 1 of the 4164 or 41256 must therefore no longer be bent away, but can be plugged into the socket unchanged. Pin 8 can also remain in the socket, because the connection to this 12V line is interrupted by the missing R62. A small wire bridge from IC 13, pin 9 to IC12, pin 8 ensures that all replacement ICs get the required 5V at pin 9 - so no IC has to be changed.

The disadvantage is that there is no -5V or 12V available at the expansion bus. On the other hand only very few interfaces need this voltage (the IF 1 e.g. for the RS232 signals). But the danger of short circuits when connecting and disconnecting modules is reduced a little bit.

In combination with a switching voltage regulator you have thus a much more reliable, power saving and heat reducing power supply installed on the ZX-Spectrum.

The UHF modulators of the UM 1233 type will hardly be available, nor will TV sets equipped with a UHF tuner for receiving the broadcast signal. Therefore, the composite video modification is now mandatory. Also new TV sets are often able to convert such a video signal. In the intended area for the modulator, you can solder a RCA socket for the video output on the replica boards right away.

There are a wide variety of options. E.g. with a "Spectrum 48K Composite Video Mod" board as described under www.projectavr.com

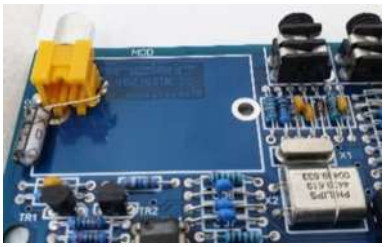
Spectrum 48K Composite Video Mod

or with a tin-plated copper sheet on which the bushing is mounted. However, the sheet should be sufficiently strong so that the socket does not give way when a cable is plugged in.

tin-plated copper sheet for mounting the socket

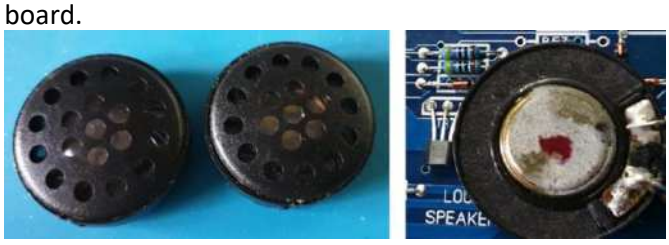
or simply drill and solder the socket directly on the board and glue it if necessary.

However, you should have a Spectrum housing available to align the socket correctly. Otherwise you will have to tinker with the case later to reach the socket.



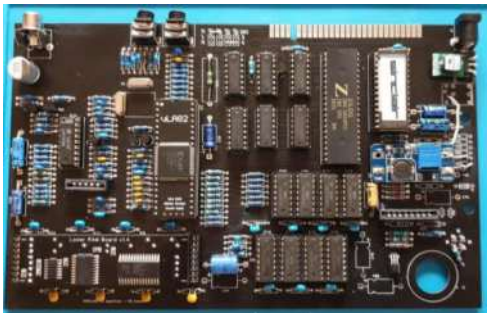
Direct installation of the video jack

Suitable loudspeakers (40 Ohm) are also offered only rarely and expensively. Here it is worth to look for an old cheap headphone. They often contain 32 Ohm speakers, which are also perfect for the Spectrum board.



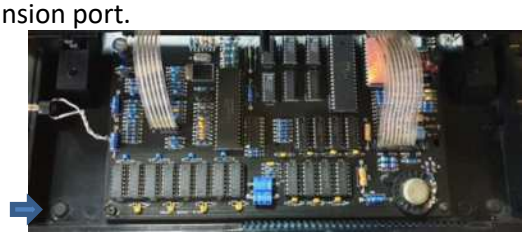
Matching loudspeaker from a cheap headphone

Finally, here are a few pictures of finished replica boards:



Finished Issue 4b PCB

With the Issue 4b replicas, not only the "built-in short circuit" is to be criticized, but also the missing holes in the lower board area and above between MIC jack and expansion port.



Cut hole

The hole at the bottom left also cuts through a conductor path, which has to be patched somewhat unsightly.

The mounting of the coil is also delicate. The soldering points of the board have too small a diameter, so that the coil cannot be plugged in properly, but must be soldered “on top”. Thereby the pins of the coil have to be shortened, otherwise it is too high for the case ...

Instead of the 4116 RAM, the (more reliable) 4164 were used here.

An old Walkmen earpiece serves as speaker.

If you use an EPROM, you have the possibility to burn a Dual-ROM. For this the diode circuit is above the speaker.

VTECH TV IQ 512 EDUCATION COMPUTER

BY JOACHIM GEUPEL

The IQ TV512 from VTech is a basic programmable home computer - an education or learning computer, targeted at children. The computer was built from 1998 to 2003 and sold for about € 90 to € 120. As an educational computer it takes an exceptional position, because most other educational computers from VTech are equipped with an LCD display. The IQ 512 is the extension of the IQ 128. It has 512 kB main memory and runs with a 68000 processor integrated in a custom chip. The processor itself is nowhere to be found on the motherboard. The clock frequency is 16MHz. A 128kB flash ROM serves as mass storage. The computer is a closed system. It is not possible to expand it. Because of this it is equipped with a large number of programs. There are some games, an organizer, learning software and office programs in the ROM, which are displayed on the main screen after the system starts and can be selected by using the mouse.

The IQ 512 can be connected to a TV, since it has an RF output, as well as to a video monitor via the FBAS output. The sound can be tapped at the audio output.

When the device is turned on, a welcome animation appears that shows the name of the computer. This disappears after a short time and a graphical interface that can be operated with the included mouse appears. It is reminiscent of Windows 3.1* and is called the desktop. The individual programs can be started via the desktop.

Similar to other learning computers, there are programs for learning how to use the keyboard. Quiz games are supposed to expand general knowledge. Simple graphics and drawings can be created with a painting program and clip arts can be integrated. A composition program makes it possible to create melodies. The device also teaches basic knowledge of working with office programs and programming. For this purpose, a telephone book, a small database, a word processor and a spreadsheet are available. To learn programming, a Basic interpreter is built in.

The computer has no possibility to connect an external mass storage in the form of a cassette recorder or a floppy disk drive. Interfaces are present, but these are used to connect a printer via a Centronics interface and to connect to a PC via a serial interface for data exchange. However, a mass memory is present in that there is a flash ROM with 512 KB capacity in the device, in which data can be stored permanently. Additional data can be stored on an external memory module, which is the same as the one used for the Genius IQ 128. A file manager allows copying or deleting files. Surprisingly, the flash memory is called "Super Memory".

The IQ 512 is without a doubt an interesting computer. There is a lot of brain power in the concept. However, I wouldn't give my child such a computer. Although the computer is clocked with 16MHz, the operation is anything but comfortable. The mouse runs relatively poorly and the clicks are only accepted hesitantly. This may be due to the construction of the mouse, which is really very simple - instead of the photoelectric sensor that was common at the end of the 90s, which detects the impulses via a pinhole wheel, several sliding contacts pick up the movements on a contact wheel - or due to the cumbersome programming of the system in general, I can't say. I would rather provide my child with a real PC, since everything runs on it that runs on the IQ 512 as well.

Since I come from the time of Basic programmers, I was very interested in the Basic interpreter. So I started it. First of all: the Basic interpreter takes a lot

of getting used to. After starting it, a window opens that looks very much like Windows 3.1*. A menu provides four entries. These are actually self-explanatory. What actually bothered me, however, is that there is no real help underneath the help entry. Only a few commands are explained here, otherwise the help leaves you pretty helpless.

The first thing that catches your eye in the main window is the huge entry "Main memory". This entry takes up almost a third of the screen's width. This entry is by no means a one-time occurrence, it returns with every press of "ENTER" and takes away a lot of space to work with.

Whoever thought of this - it was a really stupid idea!

You can work with the interpreter, but there are better implementations, as many other computers from that time and before it have shown. All in all, the VTech IQ TV 512 is a successful piece of work, but in my opinion the concept was not thought through to the end and misses the target group of children, even if only just. A pity really. Still, it's better than the single-line display like the VTech Laser 50, which also calls itself an education computer.

Technical Data	
Manufacturer:	Video Technology
Year of release:	1998
Processor:	68000 Clone with 16MHz clock frequency.
RAM:	512kB
ROM:	unknown
Text mode:	unknown
Graphics:	400 x200 pixel, estimated
Colors:	256
Sound:	Sampling sound via audio jack
Keyboard:	Typewriter, QWERTZ, 97 keys. 2 keys ON/OFF, 3 keys for control without mouse.
Disk:	Internal flash memory 512kB external flash memoryf 128 kB
Connections:	Power supply 9V, mouse via RJ45s, Centronics, PC-Link 3.5mm jack.

*** Windows 3.1 ©&®by Microsoft**

THE ZX SPECTRUM NEXT »DOT« COMMANDS

BY CHRISTOF ODENTHAL

With the »dot« commands, i.e. with a dot at the beginning, you can extend the command set of the Next. But there are already many predefined ones in the directory "c:/dot/". You don't have to pay attention to upper/lower case. For filenames without spaces and ":" you may leave out the quotation marks. For esxDOS, there are more DOT commands in the directory "c:/bin/".

Many commands have a help parameter - unfortunately without a uniform call. Sometimes you just have to type the command without parameters, sometimes with "-h" or "-?" or "--h" (e.g. .DATE -h).

I also noticed that some commands have a problem with paths with drive letters, e.g. "c:", sometimes don't accept paths at all - you have to use ".cd" to get into the directory and you are only allowed to use the filename - or don't accept long filenames, with or without spaces - and you have to use the short notation, if necessary with the wave "~".

So if something does not work, try without "c:" and quotation marks in the short notation!

Here is a hint from the editor: the dot commands are marked with a - » - at the beginning and with a - « - at the end. These mark the command and must not be typed!

(jg)

GENERAL FILE OPERATIONS

Command	Meaning
.CD	Show / change directory. e.g. ».cd demos" or ".cd ..« or ».cd "c:/demos/« or ».cd«.
.CP	→ Copy a file (source → destination). e.g. ».cp test.bas test2.bas«
.FIND	→ Find files in the directory tree. e.g. ».find "c:/dir/" -name=file*«
.LS	→ Like "CAT" but with date, size, and short name. Note: Starting with NextZXOS version 2.07 »CAT« shows long file names.
.MKDIR	→ Create a new directory. e.g. ».mkdir mydir« or ».mkdir "c:/mydir"«
.MV	→ Rename and/or move a file (without drive!). e.g. ».mv test.bas test2.bas« or ».mv -t "/dir/subdir" test.bas«.
.RM	→ Delete a file. e.g. ».rm test.bas«
.RMDIR	→ Delete a directory (always with full path!) e.g. ».rmdir "c:/mydir" «

FILE I/O:

.LSTAP	→ Displays the contents of a .TAP file. e.g. ».lstap "c:/demos/classics/machined.tap"«

.NEXLOAD	→ Loads and starts ".NXT" files. e.g. ».nexload "c:/tools/dev/tileeditor/tileeditor.nex"«
.PISEND	→ Sends commands/files to the Raspberry Pi Zero in the Next. e.g. »".pisend file«.
.RUN	→ Searches (and starts) .BAS, .DOT, .NEX, .O, .P, .SNA, .SNX, .TAP, .Z80 files. e.g. ».run -? *.bas« or ».run basnake.bas«.
.TAPEIN	→ Redirect loading from cassette to a .TAP file e.g. ».tapein mygame.tap : load "t:mygame"«
.TAPEOUT	→ save to tape redirect to a .TAP file. e.g. ».tapeout mytape.tap : save "t:myproggy"«

SEARCH / DISPLAY:

.EXTRACT	→ Display a part of a file, write to memory or file. e.g. ».extract "c:/dot/keyboard.scr" +0 6144 -m 16384« e.g. ».extract "c:/dot/keyboard.scr" +6144 768 -m 22528«
.MORE	→ Displays a text file page by page. e.g. ».more "c:/readme.md"«
.STRINGS	→ Displays all readable text in a (binary) file e.g. ».strings "c:/dot/guide" -n 6«
.QE	→ A text editor like »Vi« (Linux). Exit with <caps shift> Z Z. Guide with ».guide qe«.

SPECIAL FILE OPERATIONS:

.CHMOD	→ Change file and directory attributes (write protection, etc.). e.g. ».chmod +r test.bas«.
.DEFRAG	→ Defragment a file (i.e. combine parts). e.g. ».defrag file«
.LFN	→ Display the long file name for a short one (see also ».ls«). e.g. ».lfn contri~1.md«
.MAKELNK	→ Creates a forwarding file ».LNK« to directory/file in browser. e.g. ».makelnk startfile linkfile.lnk«
.MAKERUN	→ Creates a forwarding file ».LNK« to directory/file in browser. e.g. ».makerun startfile«
.METADATA	→ Reads/writes the meta data of a file. e.g. ».metadata r jetpac.z80 LOAD«
.MKDATA	→ Creates a mountable +3DOS image (for NextZXOS, CP/M). e.g. ».mkdata DRV-A.P3D 16« → Creates 2 MB image file for NextZXOS. e.g. ».mkdata CPM-A.P3D 2« → Creates 16 MB image file for CP/M
.MKSWAP	→ Creates a swap file for NextZXOS MC programs. e.g. ».mkswap SWP-0.P3S 5« → Creates 5 MB swap file for NextZXOS.

MUSIC:

.NDAWPLAY	→ Plays a 9-channel DAW audio file (see "c:/demos/NextDAW/"). Attention probably has problems with long filenames and paths! e.g. ».ndawplay /demos/nextdaw/songdo~1/onlyyo~1.ndr«
.PISEND	→ Plays music (SID, MOD, SNDH, MP3) via the RasPi. Attention, the file must be transferred before! e.g. ».pisend file.mp3 : .pisend -q : .pisend -c nextpi-play_mp3 file.mp3«
.PLAYAKY9	→ Plays a 9-channel Arkos Tracker audio file. e.g. ».cd /demos/aky-so~1 : .playaky9 v8.aky«
.PLAYPT3	→ Plays a Pro-Tracker 3 audio file. e.g. ».cd /demos/ts-songs : .playpt3 summer.pt3«
.PLAYWAV	→ Plays a WAV audio file. e.g. ».playwav song.wav«

GRAPHIC:

.BACKOFF	→ Switch off Screen Layer 2 (like Basic "LAYER 2,0").
.BACKON	→ Switch on Screen Layer 2 (like Basic "LAYER 2,1").
.BMP2SPR	→ Convert a BMP image file to sprites.
.BMPCONV	→ Convert an image file to Next format.
.BMPLOAD	→ Load an image file.
.SHOWSIMG	→ Image viewer.
.SPREDIT	→ Opens the sprite editor.
.TESTSPR	→ Demo / test the Next sprites (which are currently in Ram!).
.TOSPRRAM	→ Copy a sprite file into the special sprite ram of the Next. e.g. ».tosprram test.spr" - test with ".testspr«".

EMULATION:

.BOOT	→ Change to another "Personality" (0-99) (emulation, e.g. ZX81).
.CORE	→ Start an alternative core (by its name).
.CPM	→ Start the CP/M operating system (if installed).

FOR BASIC PROGRAMS:

.$	→ Run a DOT command with a string instead of quotes. Attention, double quotes may be necessary! e.g. »LET a$=chr$ 34 + "19:39:30" + chr$ 34 : .$ time a$<<
.BROWSE	→ Opens file browser to select a file (return in a variable) e.g. ».browse -t bas a$ « → Select Basic file and store it in a$.
.ECHO	→ Output characters like PRINT.

.NEXTVER	→ Write the NextZXOS version into a variable. e.g. »LET a=0 : .nextver a : PRINT a«

CONVERSION:

.BAS2TXT	→ Convert a Basic file to text (probably doesn't work for .NEX files).
.DZX7	→ Decompress a (large) ».zx7« file.
.TXT2BAS	→ Convert a text file to Basic.
.UNZIP	→ Extract files from a zip archive.
.UUENCODE	→ Convert a binary to a text file.

NETWORK:

.HTTP	→ Data transfer over HTTP (GET and POST).
.NBNGET	→ Loads a NextBestNetwork file from the Internet via WiFi.
.NXTP	→ Get the date and time from a time server on the Internet.
.TCPPING	→ Send a »ping« to the Internet (see if a host answers).
.TERM	→ Start a terminal program.
.UART	→ A simple terminal program.

HARDWARE:

.CONFIG	→ Configure ZX Spectrum NEXT hardware.
.DATE	→ Display or change the date of the real-time clock.
.DISPLAYEDGE	→ Set picture margins for a video mode on the monitor.
.ESPBAUD	→ Reset ESP module or set transmission speed.
.ESPUPDATE	→ Update the firmware of ESP WiFi module.
.I2CSCAN	→ Display devices on the I2C bus.
.INSTALL	→ Installs a Next driver.
.MAKETBU	→ Only for power users! Edits the file »TBBLUE.TBU«.
.PI2C	→ Test if the Raspberry Pi Zero responds in the Next.
.PS2MODE	→ Change the PS2 port of the Next to mouse or keyboard.
.TIME	→ Display or change the time of the real-time clock.
.UNINSTALL	→ De-install a Next driver.
.XPER	→ Only for power users! Read Xilinx peripherals.

MISCELLANEOUS:

.BROWSEPREFS	→ Configure the appearance and display of the browser.
.COWSAY	→ Draws an ASCII-type cow with the specified text.
.CLEAR	→ Free resources to free memory.
.DONTRUN	→ Just type and try!
.EDITPREFS	→ Configure the appearance and display of the editor.
.GUIDE	→ Tool to display hierarchical documentation.
.MEM	→ Displays the current RAM memory usage.
.SPUI	→ "Stale Pixels User Interface": a tool to build menu system.
.COFF	The command does not work properly - it should probably turn off the RAM contention of the ULA. It will not be included in a future release.

»NEW LIFE FOR THE OLD SPEECH MODULE CURRAH µSPEECH«

BY HEINZ JUNEK

Some of us may still have the speech module Currah µSpeech in the tinkering box. Probably the last time it was used was decades ago. There are probably two reasons for this. First, the software was only available for the English language, and the programming was quite cumbersome because the sentences first had to be converted into a suitable transcription for the software. Secondly, the Currah µSpeech only works with a TV via the UHF connection, because a separate audio output was not provided. But who still uses his ZX Spectrum with a TV via UHF?

In this article, I want to present solutions to both problems and also introduce a German speech compiler.

THE AUDIO MODIFICATION

Let's start with the hardware problem. How can an audio connection be realized without damaging the device mechanically or electrically? Let's have a look at the schematic I took from the PCB.

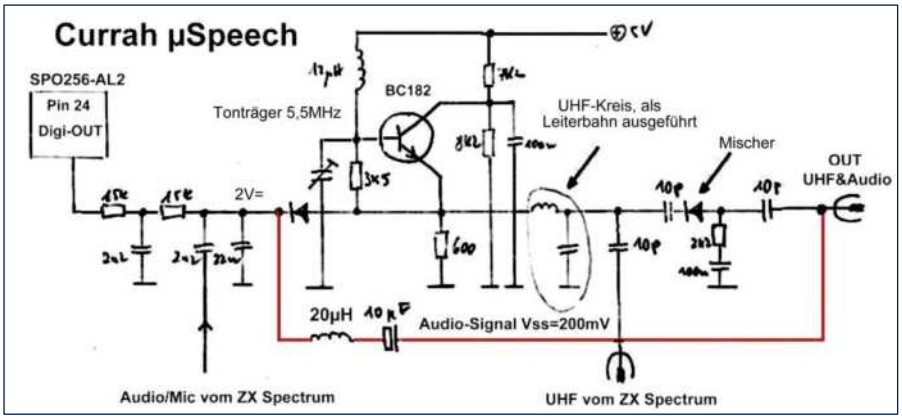


Fig1: Circuit diagram - detail

At pin24 of the voice chip SPO256-AL2, the pulse width modulated audio signal appears. The frequency carrier is about 50kHz. Via the low pass, formed by two 15k, one 2n2 and one 22n capacitor, an audio signal of Vss=200mV is applied to the diode. There, a small choke and a 10µF electrolytic capacitor can pick up the audio signal and feed it to the output RCA jack. At this jack, there is now at the same time the audio signal for feeding an AF amplifier, but also the old TV signal for those who stayed with the TV set after all. In picture 2 you can see the practical design. When opening the housing shells, some caution is required, because the halves are glued together.

Fig. 2: The NF Bridge

A PROGRAM FOR SPEECH CONVERSION IN GERMAN

Now to the second problem, the speech output. This problem breaks down into two parts. First, the given text must be translated by hand or by a suitable program (see below) into a sequence of speech sounds, the allophones. Second, the Currah µSpeech must then be activated to output this sequence. Now it is necessary to read section 6 in the manual of the Currah µSpeech more exactly. According to this, the necessary entries must be made on the addresses 65367-65361. This means in detail that the allophone sequence generated in the first step must be written into the RAM in descending order starting with address 65361. Let the address of the last allophone to be output be Q<65361.

In the second step, this address is to be entered into the "buffer pointer" (65365/65364).

The logic of the Currah µSpeech has worked in such a way that the speech output starts when Q=(65365/65364)<65361.

Automatically, the speech chip then shifts the allophone sequence and the buffer pointer up one address after each output. If the buffer pointer is finally =65361, the process stops. This may sound a bit complicated, but on re-reading it is not. Enclosed is an example program. The output is the text:

"MEIN ALTER SPECTRUM SPRICHT JETZT SEHR SCHOEN. DAS FREUT MICH SEHR."

(Since the original software is English-language anyway, there are no conventions that make German language output necessary. [jg])

This text is assigned to the variable T$ in line 170, and it can be changed as desired. Only capital letters are allowed, and umlauts must be resolved, e.g. Ä->AE, etc. In lines 240-545 the allophone sequence is generated and stored in RAM, and in line 580 the buffer pointer is set. This makes the Currah µSpeech active and the speech output starts.

I remind you that the tedious typing of the program can be done nowadays by Paste'n'Copy and a PC program txt2tap.exe. I hope you enjoy experimenting! And if you don't own a Currah µSpeech, you can try my program on an emulator, e.g. SpecEmu. If the generation of the allophone sequence with a BASIC program is too slow for you (about 6 sec for the above text), you can write a Hisoft Pascal program, then works practically "on-the-fly".

COMPATIBILITY WITH OTHER INTERFACES

Joachim Geupel introduced the Cheetah Sweet Talker language module in SUC 225. Part of his article also dealt with the compatibility of this module with other interfaces, especially with the DivMMC Enjoy! Since I don't have this module, I can't say anything about compatibility with the Currah µSpeech. I use my Currah together with the IF1 and the new drives Oqtadrive and ZXPicoMD, and here there are naturally no problems.

GERMAN VOICE OUTPUT PROGRAM

```
100 PRINT "CURRAH SPEECH DEUTSCH": PAUSE 50
110 CLEAR 40000
120 POKE 23658,8: REM CAPS
150 GO SUB 600
170 LET T$="MEIN ALTER SPECTRUM SPRICHT
    JETZT SEHR SCHOEN. DAS FREUT MICH SEHR."
220 CLS : PRINT "Folgender Text wird
    analysiert:",,,: PRINT T$: PRINT
```

```
230 REM ******
240 LET L=LEN T$: LET A=65361+1:
    REM s. Currah-Manual Kap6
250 REM ********
260 FOR I=1 TO L
270 LET L$=T$(I)
280 IF CODE L$<65 THEN POKE A-I,04:
    GO TO 540
290 POKE A-I,P(CODE T$(I)-64)
300 IF I=L THEN GO TO 540
310 LET H$=T$(I TO I+1)
320 IF H$="G " THEN POKE A-I,P(11):
    GO TO 540
330 IF H$="D " THEN POKE A-I,P(20):
    GO TO 540
340 IF H$="EI" OR H$="AI" THEN POKE A-I,6:
    GO TO 530
350 IF H$="EU" THEN POKE A-I,5: GO TO 530
360 IF H$<>"EH" THEN GO TO 390
370 POKE A-I,7: FOR K=1 TO 3: LET A=A-1:
    POKE A-I,7: NEXT K
380 IF T$(I+2)<>"E" AND T$(I+2)<>"A" THEN
    GO TO 530
390 IF H$="SC" THEN POKE A-I,37:
    LET I=I+2: LET A=A+2: GO TO 540
400 IF H$="CH" THEN GO TO 530
410 IF H$="CK" THEN POKE A-I,P(11):
    GO TO 530
420 IF H$="IE" OR H$="IH" THEN TAN A-I,19:
    GO TO 530
430 IF H$="AU" THEN POKE A-I,32: GO TO 530
440 IF H$="ST" OR H$="SP" THEN POKE A-I,37:
    GO TO 540
450 IF I=1 AND L$="S" THEN POKE A-I,38:
    GO TO 540
460 IF H$="QU" THEN POKE A-I,P(11):
    LET I=I+1: POKE A-I,P(23): GO TO 540
470 IF H$="AE" THEN POKE A-I,26: LET I=I+1:
    POKE A-I,26: GO TO 540
480 IF H$="OE" THEN POKE A-I,52: GO TO 530
490 IF H$="UE" THE N POKE A-I,60: GO TO 530
500 IF H$="SS" THEN POKE A-I,55: GO TO 530
510 IF L$="X" THEN POKE A-I,4: LET A=A-1:
    POKE A-I,8: LET A=A-1:
    POKE A-I,55: GO TO 540
520 GO TO 540
530 LET I=I+1: LET A=A+1
540 NEXT I
545 POKE A-L-1,0: POKE A=A-L-2,157:
    REM silence
550 REM **********
555 PRINT "AUSGABE"
558 GO SUB 710
560 LET Q=A-L-2:
    REM Setze Bufferpointer auf Q
570 LET QH=INT (Q/256): LET QL=Q-256*QH
580 POKE 65365,QH: POKE 65364,QL
582 PRINT : PRINT "->TASTE"
585 LET K$=INKEY$: IF K$="" THEN GO TO 585
590 STOP
595 REM ************
600 REM PHONEME DEUTSCH
610 REM OFFSET FUER ASCII = 64
620 PRINT ,,"ALPHABETISCHE PHONEM-LISTE"
630 DIM P(26): RESTORE
640 FOR I=1 TO 26: READ X:
    PRINT CHR$ (64+i);"=";X;" ",:
    LET P(I)=X: NEXT I
650 PRINT : PAUSE 50
660 REM BSP „A"=P(1)=24,...
670 DATA 24,28,57,33,7,40,61,27,12,25,42,45,
     16,11,53,9,42,51,55,17,30,40,35,0,0,38
 680 RETURN
 710 REM *******TESTAUSGABE
 720 FOR I=0 TO 20: PRINT PEEK (65361-I);
     " ";: NEXT I: PRINT "..."
 730 RETURN
```

ADVENTURE SOLUTION »THE ARROW OF DEATH (PART 2)«

BY HARALD LACK

1983 Brian Howarth (Digital Fantasia)
Hardware used: PC with X128 emulator

Dear friends of »Mysterious Adventures!«

After we have acquired some basic knowledge in the first part of the adventure to obtain and finally use the "Magic Arrow", in this second part it's just a matter of finding someone who can construct the arrow from our parts. After that we "only" have to track down and kill the evil Xerdon. This sounds relatively easy, but in the end it is not so easy to implement. Brian Howarth has again built in some trickery in his work from 1983. But some things are so obvious that you are almost pushed on it with your nose. But more about that in the course of my review. An interesting fact is, that the program was again published by Digital Fantasia. About the program itself, it should be noted that it has the "usual" premises that you might expect in such a program from 1983, especially if you compare it to other adventure games of that time. There are also a lot of objects to find, which you can sometimes use in close proximity - or not. A little talent for combination doesn't hurt. In addition to the objects, visible paths are also indicated, as they are described under "I can see". So much only briefly about it. Unfortunately, the program also has a few "illogical" directions, that is, if you

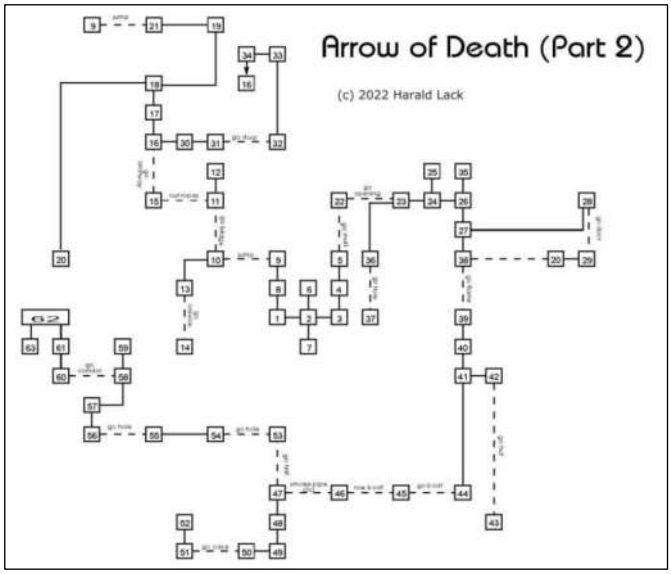
first go in one direction and then immediately back, you arrive somewhere else. Well, this makes the creation of a usable plan then sometimes quite difficult. Nevertheless I tried to make the best out of the situation. I hope there are no mistakes/inconsistencies and it helps you. There are also a lot of undefined directions, which result from commands like "go somewhere". Nevertheless I tried to show everything in a clear way - as far as you can speak of an overview with this map. If you have a look at the location descriptions below, you will notice that there are quite a few locations with the same name. As always, I have provided them with consecutive numbers because they may well be different locations, even if this is not always necessarily the case. But I tried to make the best of this - I hope in your interest that I have succeeded. Well, before I bore you with my introduction and confuse you more than necessary, I may give some general tips for all "self-tryers", which I have collected from various sources.

- To get past the skeleton it is helpful to work it with a large stone
- Some dead animals have keys that can be put to good use
- The sword helps with the ropes on the drawbridge.
- The herb can be eaten to give it strength.
- If you have enough power you can turn the wheel.
- Arnid is very receptive to the herb
- There is no harm in digging in the cave and the pile of earth.
- You should rub the stone and later give it to the right person
- You can reach the wheel only if you are dressed in the uniform.
- You can remove the veil by playing a little piece of music on the organ.
- You can get to the ledge by jumping from the edge of the abyss.

So much for the tips and hints. The following solution leads through 63 locations. I hope they are not too confusing. On our way we come to...

01) On the edge of a marsh
02) In a featureless plain (1)
03) In a featureless plain (2)
04) At the start of a narrow gorge
05) In a narrow gorge
06) In a featureless plain (3) / weird shrub
07) In a featureless plain (4) / flint stone
08) On a rocky plateau
09) On the edge of a deep chasm
10) On a narrow ledge (1) / rope bridge
11) In the middle of the bridge / bridge support ropes
12) On a rocky ledge / straggly weed
13) On a narrow ledge (2) / narrow crevice, iron helmet
14) In a tiny cave / oil lamp
15) On a flat apron of stone / stone archway, piece of rope
16) In a dimly lit cavern
17) In a stone corridor (1)
18) At the top of a staircase (1)
19) In a very windy room / giant kite, dead warrior, warriors uniform
20) In a huge stone chamber / giant iron wheel, sinister guard
21) On a plattform above the gorge
22) In a pool of mud / huge stone slab in wall, large iron lever, dark opening
23) In a huge hallway
24) In a stone corridor (2)
25) In a guard room / grotesque animal, key
26) In a stone corridor (3)
27) At the foot of a staircase
28) At the top of a staircase (2) / bolted door
29) In a stone corridor (4) / open door
30) In a stone corridor (5)
31) In a stone corridor (6) / locked door
32) In a store room / loaf of bread, slab of cheese
33) In a stone corridor (7)
34) In a stone corridor (8)
35) In an underground stable / starving mule -> happy mule
36) In a dungeon area / grating set in floor
37) In a smelly dungeon / arnid the fletcher
38) In a temple / ancient tapestry, silver button in wall, strange altar, candle, column of flame
39) By an altar
40) On a mountain
41) By a lake
42) By a hut / wooden hut
43) In a hut / briar pipe, tobacco
44) On a jetty / small rowing boat
45) In a boat / wooden oars, jetty
46) In a fish´s stomach / ragged cloak
47) On a rocky beach / animated skeleton -> pile of bones
48) In a green meadow
49) On a mountain trail (1)
50) On a mountain trail (2) / cave entrance, large rock
51) In a cave / shovel, dynamite with short fuse
52) On a lofty pinnacle of rock / cairn in stones, smooth shiny stone, old beggar -> magic bow
53) On a dirt trail / mound of earth -> hole
54) In a grubby tunnel (1)
55) In a grubby tunnel (2) / large boulder -> large hole
56) In a marble room
57) By a staircase (1)
58) By a staircase (2) / shimmering veil, corridor
59) In a music room / large pipe organ, music sheet
60) In a corridor
61) In a passage

62) By a window / glass window
63) In a room with slits in the wall / slits in the wall -> shot at xerdon



So much for the locations of my attached plan. Since I have already given some information up to this point, I would like to continue with the step-by-step solution. At the beginning of the adventure we are standing around a bit indecisively at the edge of a swamp (we also have one or the other item from the first part with us)..... and then it goes on like this:

E, E, N, N, DROP ARROWHEAD, DROP BRANCH, DROP FEATHERS, S, S, W, N, GET SHRUB, S, S, DIG (we hit a rock), GET FLINT, N, W, N, N, JUMP (we get to a bridge) GO BRIDGE (some ropes are lying around) N, GET WEED, S, S, D, GET HELMET, WEAR HELMET, GO CREVICE, GET LAMP, N, U, GO BRIDGE, HOLD ROPES, CUT ROPES (we drop down relatively safely and get to a cave), GET ROPE, LIGHT LAMP, GO ARCHWAY, N, N, U, EXAMINE WARRIOR (he has a uniform - not necessarily unusual for warriors), GET UNIFORM, WEAR UNIFORM, D, D, EAT WEED (surprisingly, we feel better right away), TURN WHEEL, U, U, GET KITE, W, JUMP (to a round off), S, S, E, E, N, N, REMOVE HELMET, DROP HELMET, REMOVE UNIFORM, DROP UNIFORM, DROP KITE, GET ARROWHEAD, GET BRANCH, GET FEATHERS, GO MUD, EXAMINE MUD, PULL LEVER (the paneling slides to the side), GO OPENING, E, N, KILL THE ANIMAL (drops a key we will soon need), DROP SWORD, GET KEY, S, E, S, U, UNBOLT DOOR, GO DOOR, W, U, S, S, E, E, UNLOCK DOOR, GO DOOR, DROP KEY, GET BREAD, N, W, S, N, N, D, E, GO DOOR, D, N, N, FEED MULE (it's in a good mood after feeding and now follows us wherever we go), S, W, W, D, TIE ROPE, TO GRATING, TIE ROPE, TO MULE, PULL MULE (the gate is open), GO HOLE (we meet Arnid the bow maker - he's not doing so well), GIVE WEED, TO ARNID, MAKE ARROW (he wakes up and makes us the magic arrow), U, U, E, E, S, S, EXAMINE TAPESTRY, PRESS BUTTON, EXAMINE ALTAR, LIGHT CANDLE, PRAY (the flames are now weaker so we can dare to go through), GO FLAME (we get to an old altar), S, S, E, GO HUT, GET PIPE, GET TOBACCO, FILL PIPE, N, W, S, GO BOAT, GET OARS, ROW BOAT (a fish swallows us and we end up in its stomach), LIGHT PIPE, SMOKE PIPE, SMOKE PIPE (it can't take the smoke from our pipe and spits us out again), S, S, W, GO CAVE, N, EXAMINE CAIRN, GET STONE, RUB STONE (the beggar from the first part is back), GIVE STONE (gives us a bow), GET BOW, S, DROP OARS, GET SHOVEL, DIG, GET DYNAMITE, E, GET ROCK, E, N, N, SMASH SKELETON, GO TRAIL, DIG, GO HOLE, E (a fat boulder blocks our progress), DROP DYNAMITE, LIGHT FUSE (get out of here fast now, the fuse is short), W, WAIT (boom! The rock is legend), E, GO HOLE, N, U, N, EXAMINE ORGAN, PLAY MUSIC, S (the veil has evaporated), GO CORRIDOR, N, N, S, EXAMINE SLITS, SHOOT XERDON (that's it!) - nothing more to add!

I hope no mistakes have crept in with my remarks.

So much today from my side. There are still a few representatives from the "Mysterious Adventures" series left. See you then.....

© Harald Lack

ADVENTURE SOLUTION »ESCAPE FROM PULSAR 7«
BY HARALD LACK

1983 Brian Howarth/Wherner Barnes
(Digital Fantasia)
Hardware used: PC with X128 emulator

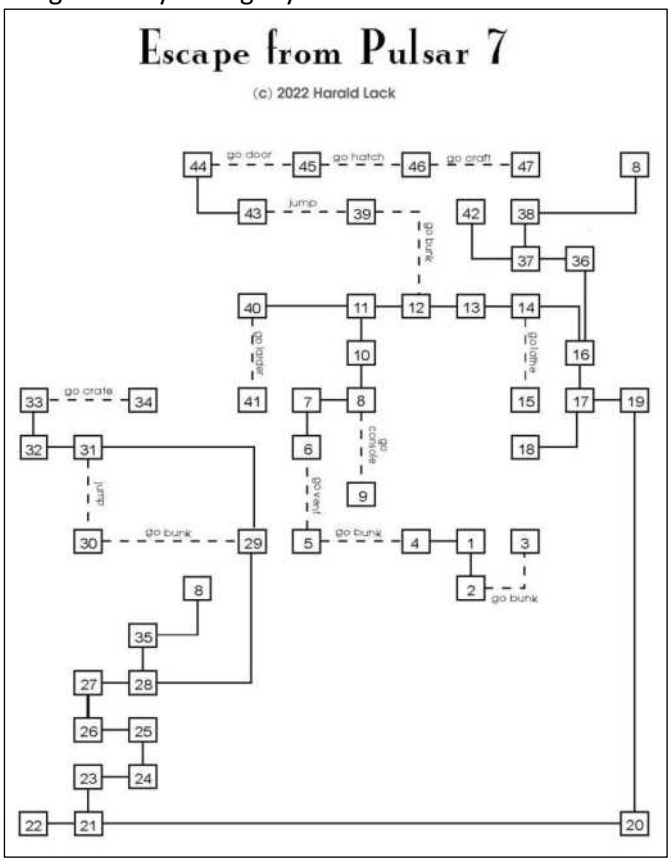
Hello fans of the »Mysterious Adventures!«

The coverage continues with "Escape from Pulsar 7" from the well known adventure series. This adventure was again written by Brian Howarth with the help of Wherner Barnes. It was published - like its predecessors - by Digital Fantasia in 1983. Like the other representatives of this series, the program is again intuitively solvable with relatively little effort, there are just again those famous "indirect directions" and what

bothered me a lot was a large and confusing maze (Maze of ventilation ducts), which does not help to keep track. It really killed my nerves. Here perhaps at least the one or other explanatory text would have been helpful around itself better to be able to orientate, which would have taken also the production of a plan into account. So I have tried to create a coherent plan based on my explorations, but it is certainly not necessarily meaningful. Whether I succeeded - we will see. In any case, I have made some progress with it. May it also be helpful to you. Unlike in Arrow of Death, here we are - once again, you could say - in space. Our task is to arrive safely at the destination with the space freighter Pulsar 7 on the return flight from an alien planet, where we picked up a mysterious creature for the intergalactic zoo. Now, unfortunately, the creature has broken out and killed the crew. If you feel reminded of the movie Alien, you are of course right. So we have to try to reach the escape pod to get away before the creature kills us too. So far everything is clear. So that we are not unnecessarily long on the torture, I may also list the 47 locations to my corresponding plan. This also includes the items as well as the visible exits, which are described in the program text. Let's go...

01) In the freighter´s social room / couch, (closed) steel door, sign , dull illuminant rod
02) In a crewman s cabin (1) / crewman´s bunk, open door
03) In a nice warm bunk / auto dispense pillow, circuit board
04) In a crewman´s cabin (2) / crewman´s bunk
05) In a crewman´s bunk / large air vent
06) In a large air vent / dust
07) At the junction of three passages
08) On the ship´s bridge / control console, black and white button
09) Inside the control console / electrical edge connec-tor
10) In a metal passageway (1)
11) In a junction of three passges
12) In the captain´s cabin / captain´s bunk
13) In a metal passageway (2)
14) In a workshop / centre lathe, socket
15) Underneath the lathe / tool compartment, screwdriver blade, rough metal bar
16) In a maze of ventilation ducts (1)
17) In a maze of ventilation ducts (2) / cake tin
18) In the reactor room / hammer, piece of wood
19) In a maze of ventilation ducts (3)
20) In a maze of ventilation ducts (4)
21) In a maze of ventilation ducts (5)
22) In a store room / locker, smashed door, space suit
23) In a maze of ventilation ducts (6)
24) In a maze of ventilation ducts (7)
25) In a maze of ventilation ducts (8
26) In a maze of ventilation ducts (9)
27) In a maze of ventilation ducts (10)
28) In a maze of ventilation ducts (11)
29) In a totally wrecked cabin / wreckage, bunk
30) On a bunk / metal grille
31) In a cable runway / length of cable
32) In a cargo storage hold (1) / specimen cage
33) In a cargo storage hold (2) / huge crate
34) In a large crate / square block
35) In a maze of ventilation ducts (12)
36) In a maze of ventilation ducts (13)
37) In a maze of ventilation ducts (14)
38) In a maze of ventilation ducts (15)
39) In the captain´s bunk / white tablets, metal panel -> hole
40) In the galley / oven, larder, bottle of water
41) In a larder / bag of flour, bag of raisins
42) In the creature´s hideout /magnetic boots, creature
43) In a large metal pipe / dust
44) In the emergency airlock / red button, (open/closed) inner door, (closed/open) outer door
45) Out on the hull / open hatch
46) In the shuttle craft bay / shuttle craft, lever
47) In a shuttle craft / yellow button

So far the locations/objects/directions of the attached plan. As I said, especially the area with the labyrinth is based on my own notes and does not guarantee complete correctness due to the homonymous designation. I hope it fits - at least I didn't notice anything contrary during my con-trol.



At least from here on, everyone can make his own way or use the following solution.

We start in the "social room" of the freighter Pulsar 7. From there on it goes on like this:

SHIFT COUCH (underneath we find a glow stick), GET ROD, S, CLOSE DOOR (something appears automatically in the following room), GO BUNK, SHIFT PIL-LOW (here we find an electronic board), GET BOARD, D, N, W, GO BUNK, GO VENT (the deadly dust has cleared by now so we can continue here), N, E, GO CONSOLE, INSERT BOARD, N, EXAMINE CONSOLE (two switches are here - the agony of choice for us), PRESS WHITE, N, N, E, E, GO LATHE, EXAMINE COMPARTEMENT, GET BLADE, N, D, TURN ROD (turned on - it lights up), S, D, GET WOOD, MAKE SCREWDRIVER (we use the blade and wood from the reactor room for this), GET HAMMER, U, GET TIN, E, S, W, W, SMASH LOCKER, USE HAMMER, EXAMINE LOCKER, GET SUIT, E, N, E, N, W, N, E, U, SEARCH WRECKAGE (a bunkhouse is here), GO BUNK, EXAMINE CEILING (there's a grate on the ceiling), REMOVE GRILL, JUMP, DROP HAMMER, GET CABLE, W, N, GO CRATE, DROP WATCH, GET SQUARE BLOCK, W, S, E, D, D, N, U, N, N, E, E, FIX LATHE (with the cable you brought), TURN SQUARE BLOCK (it's round now and matches the oven!), GET ROUND BLOCK, D, N, W, N, U, N, N, E, GO BUNK, EXAMINE BUNK, GET TABLETS, D, W, W, DROP SUIT, FIX OVEN (with the round block from before), GET BOTTLE, EMPTY BOTTLE (into the can), GO LARDER, GET FLOUR, DROP SCREWDRIVER, GET RAISINS, N, MIX CAKE (the ingredients are water, flour, raisins, and the pills that come out as sleeping pills!), BAKE CAKE, GO LARDER, GET SCREWDRIVER, N , E, E, E, D, N, W, U, GIVE CAKE (the creature eats the cake and falls asleep - was somehow different in the movie - not so easy), GET BOOTS, D, N, U, N, N, E, GO BUNK, EXAMINE CEILING (another grid!), REMOVE PANEL (good thing we have the screwdriver now), JUMP, U, WEAR SUIT, WEAR BOOTS, PRESS RED (the hatch opens), GO DOOR, GO HATCH, PULL LEVER, GO CRAFT, PRESS YELLOW (we managed to escape and save our skin after all!!).

What happens next remains open.....naja, the tension must be maintained.

So much from my side for today - until soon with another part from the series.

Happy adventuring!

© Harald Lack

ADVENTURE CORNER

BY MIRON SCHMIDT

Hello dear adventure friends! Thomas has already indicated that he wanted to hand over the adventure corner due to time constraints, so from this issue on I'm taking over the helm. The content won't change much, except that I'd like to use this introduction to touch on one topic at a time.

Today I wanted to start with adventure systems. As mentioned in issue 230, many games are being written with Adventuron or DAAD at the moment. But there were systems specifically for creating adventures back in the 1980s that enjoyed great popularity, e.g. the distant predecessor of DAAD, The Quill by Gilsoft (1983), or the Graphic Adventure Creator GAC by Incentive Software (1985). Both were also used to write many commercial games, most of which were then released at least for the Spectrum and the C64, in the case of The Quill for example some of the Double Play Adventures (only for Spectrum) or the Dragon Star Trilogy by Delta 4 and with GAC the well-known Incentive games (Winter Wonderland, Mountains of Ket and others), but also Necris Dome and many of the games by Zenobi/John Wilson.

The Quill only offered text by default, but you could buy The Illustrator, which added (vector) graphics. Other add-on programmes enabled, for example, larger games or split graphic-text screens. GAC, on the other hand, was designed for graphics from the very beginning. Here, too, there were additional programmes that supported, for example, floppy disks, faster processing or a spell checker.

But now to the reviews: For this issue I have chosen a few current games, some of which were written with such systems.

»THE QUEST FOR THE SACRED FLAME OF HESTIA«

BY SIMON D. ALLAN, 2019

The first is no longer brand new, but it's a fine example of a modern game written with The Quill in mind. Author Simon Allan has been at it since the 80s, and you can tell the game has a certain routine, even if linguistically it feels a little awkward at times.

In terms of content, it is already clear after the introductory text what to expect: a reasonably straightforward historical adventure with fantastic elements. A large part of the course is spent looking for something, first for the actual goal, then for the mother and for things that can help in the course of the game.

The palace at the beginning is huge and gives the impression that the whole game must have thousands of locations - but in fact it also takes up a good third of

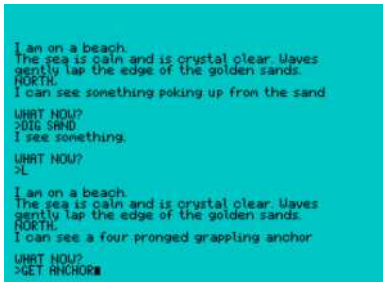
the total game. Many of the rooms are empty, however, and a trend is already apparent here that continues through the game: As is often the case in older games, you have to investigate things that are not obvious to see, and perform some actions several times, even if the description does not suggest this after the first time.

The game presents itself as quite grown-up and somewhat resembles the sandal films of the 60s. Those who are not put off by the fact that sometimes a bit of guessing is necessary to get ahead will be rewarded with a cinematic atmosphere that puts the young, self-confident hero at the centre of a thoroughly exciting story.

Download:

https://spectrumcomputing.co.uk/entry/35098/ZX-Spectrum/The_Quest_for_the_Sacred_Flame_of_Hestia

»ICELAND«
BY LUNY, 2022



This game came out in its current form last year, but it is based on a concept from 1984. Even though it calls itself "Version 1.0", it is already the third incarnation after the dropped first implementation from 1986 and the version submitted as Island Adventure to the Crap Games Competition 2022, compared to which it was once again expanded and reprogrammed.

The story is somewhat clichéd: the character wakes up on the beach of an island with no memory of how he got there. When exploring, you quickly realise that the environment is made up of countless terse descriptions of places, although they are often formulated with pizzazz. Here, too, you have to try out a lot, and unfortunately the parser written by the author himself is not up to all ideas, so you have to spend some time figuring out the right formulations.

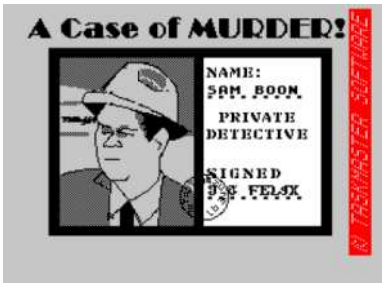
Perhaps the game is not entirely contemporary (especially in its depictions of the various places and people on the island), but in its almost desperate stringing together of somehow island-related situations it is at least original and entertaining. This can also hide for a while the fact that almost all the puzzles consist of putting objects together or handing them over to people.

At least a few hours of fun can easily be gained from this.

Download:

https://luny666.itch.io/island

»A CASE OF MURDER«
EDWARD TOOVEY, 2022



This game also has a complicated history: the publisher Taskmaster Software was founded in 1988 by two students, but never brought out a game. It was only years later that one of the planned games, The Dragnet Case, surfaced on the internet. Taskmaster founder Ed Toovey used this opportunity to publish both the finished and error-corrected form of the game and the prequel A Case of Murder as well as the sequel The Mystery of Markham Manor. The latter was written with DAAD, the other two with Professional Adventure Writer PAW, the direct successor to The Quill.

In A Case of Murder, you take on the role of Sam Boon in his first case, though it takes quite a while before this is even revealed, and the prologue is initially set in the protagonist's as-yet-unset-up offices, which have to be searched for the individual pieces of starting equipment.

Unfortunately, the game is rather lovelessly implemented: Named objects are hardly implemented, and often exactly the right word must be used in order to progress. For example, there is a refrigerator in the kitchen that is called a "frigidaire" but can only be addressed as "fridge". This carelessness continues in the descriptions, where objects are mentioned twice or are called something different in one sentence than in the next.

Interestingly, in contrast to the vast majority of text adventures, time also passes between moves, i.e. "Time passes..." is output every now and then. In fact, there is also a day-night cycle (where it is dark at night) and a growing need for sleep to match.

However, this also transferred to the feeling when playing, so there are no more details here. If you want to see for yourself, you can get all three parts for free at itch.io.

Download:

https://taskmastersoftware.itch.io/a-case-of-murder

And finally, two reviews that Thomas wrote when he still had a little time left.

»SPECQUEST«
BY GEOFF NEIL, 2021

SpecQuest is a kind of role-playing game, though you have little to develop your character with. There are only health points, hit points and some kind of tech level to perform various things. You get some hints about what to do and walk through the landscape. After each step it is advisable to search the area, be-

cause nothing is mentioned in the picture or text and yet there could be a secret in the same spot. So you walk and walk and unfortunately I found it unexciting, even when I discovered a cave and could attack mice and rats there.

The whole thing has a funny written opening credits, but the game itself lacks atmosphere. As funny as the opening credits are, an exciting back story wouldn't have been bad either. It's no coincidence that the game is reminiscent of Mike Singleton's Lords of Midnight, it uses the same (or a similar) engine. Still, as I said, I find the atmosphere a little lacking to really immerse myself in the game.

There is only a version for Spectrum +3, but it should be possible to convert the game. You can, however, play it on emulators without any problems (SPIN). Download from:

https://spectrumcomputing.co.uk/entry/37675/ZX-Spectrum/SpecQuest

»THE ERRAND BOY«
DWALIN, 2021

This is a classic graphic adventure game that has been around for a while, but was converted for 8-bit computers using Tim Gilbert's DAAD. The story is not quite clear to me here, whether it is set in modern times or in a fantasy universe, somehow it has something of both. Nevertheless, the atmosphere is successful, to which the numerous graphics also contribute. Although they are not very detailed, they stimulate the imagination. You may have messed up your last job and now you get a new, presumably easy one, but you can't mess it up again.

The parser is extensive, but the game lacks some description. This may be intentional, because trying out all directions to find the possibilities is part of the puzzle game. Here, many games offer at least the usual directions from the outset. So the game is a little more difficult, although it is a mini-adventure.

The game is also only available on +3 disk image, a format presumably supported by DAAD, but it is not exactly logical to resort to it as it is generally not very common.

Information and download links:

https://www.rudolphinerur.com/blog/2021/12/19/the-errand-boy/

And with that, I say goodbye for this time and hope to present an Adventure Corner again in the next issue. Feedback is still very welcome, also gladly on the change of personnel!

GAMES 2021
BY THOMAS EBERLE

Welcome again to our section of game reviews. Some games were put on the SCENE+ the other day and also presented there, so I had to leave them out on purpose. What else was interesting? Ellivs and I (Thomas) took a special look at the year 2021 to arrive slowly but surely in 2022 and then catch up with more recent releases.

»AGENT BLUE«
© 2020 / 2021 JAIME GRILO, JOSE SILVA
REVIEW BY ELLVIS

There are so many movies about agents, but can we actually try to be one ourselves?

Well, that's the reason why this game exists. Let's wake up the little kid inside us and help "Agent Blue" complete his missions.

Each level is placed on a screen. There is a building that we have to enter, locate the prisoner and free him or her. It sounds simple, but there are some obstacles. The first one is the doors, they are all locked, so we have to find the keys. The building itself is not empty and we have to get rid of all the terrorists guarding the priso-

ners. When we manage to do that, a car will come but beware, there will be more terrorists that we have to get rid of as well. This time the prisoner is coming with us, so we have to be even more careful. When we are finally alone, the car will take us out of the level.

Not everything in the game is against us. There is ammunition that we can collect to help us get rid of the terrorists. Also, there are envelopes, three in each level. We need them because they contain letters that we can use as a code for the levels, so we don't always have to start over. Note that the code is revealed only after the level is completed, so it's not enough to just pick up the envelopes!

The graphics of the game are simple, but clear enough and we can always see what is going on. It's colourful with very few attribute clashes. The controls are very responsive and the game is a joy to play. On a Speccy 128k AY also plays music, on a 48k Speccy we only get some beeper effects. The game is split into two files, day and night missions. Both contain 10 levels, so there is a lot to enjoy. If you like action games, I can only recommend you to become "Agent Blue" for a few moments.

Download at:

https://spectrumcomputing.co.uk/entry/37621/ZX-Spectrum/Agent_Blue

»BLOCKS'N'FOX«
© 2021 YPRINT
REVIEW BY ELLVIS

"Blocks'n'Fox" is a small puzzle game that may not impress at first glance.

But for a casual gamer with only a few minutes to spare, there are few better choices. No story to play through, no long intro, just press a button and play.

In this game we help the nameless Fox destroy bricks. These come down on us slowly and we can't hide. But the bricks are (mostly) very light, so we can easily destroy them. The game helps us to see under which column we are. When we press fire, we get a brick (or more if they are the same color and stacked on top of each other) and our fox will throw the brick back.

Once we manage to make a combination of four or more bricks, they will disappear. Once we destroy enough bricks, we move on to the next level. We can also get TNT, which brings down the whole column and is a great help especially in the later levels. Bricks that can't be removed by Fox can still be destroyed by the TNT.

The graphics are simple, with movement occurring within the attributes. The sounds are sparse but the gameplay is very good and that is what really matters here.

Download at:

https://spectrumcomputing.co.uk/entry/36953/ZX-Spectrum/BLOCKS_n_FOX

»THE NEXT WAR«
© 2021 PTOLEMIANOS
REVIEW BY THOMAS

After having presented many games for the Spectrum48k and 128k in this column, here comes the first review of a game for the Spectrum NEXT. This was not because we wanted to ignore the NEXT, but almost all releases for the NEXT were commercial and here we only review games that are available for free. That's why we are happy that "THE NEXT WAR" is free to download.

The game is a typical tower defensive game. However, there aren't many of this type on the Spectrum and none specifically for the NEXT yet, so it's about time. "Tower Defense" means enemies come from one or more sides and you have to place defensive towers in clever places to ward off the enemies. If you manage it not letting a single enemy through or only a certain number of enemies, then you have completed the level and there comes a more difficult level. The game is relatively simple in design, but works flawlessly. You have several different towers that you can place more or less freely. Once you have completed the wave, the next one follows. Both ground units and air attacks provide variety.

As for sounds, the game offers a nice presumably digital intro sound as well as several, probably also digitized shooting effects. Overall, the game is quite plain and simple and doesn't take advantage of the Next's capabilities in any way. On the other hand, it is a new genre at least on this computer and if you like it, feel free to install it:

Download at:

https://lpotamianos.itch.io/the-next-war

»SUPER MARIO BROS128K / SUPER MARIO BROS: COVID-19 EDITION«
© 2019/2020
SERGEI ANDREEVICH SMIRNOV (RUSSIA)
REVIEW BY THOMAS

Everyone has heard of "Super Mario", and Nintendo owes no little to this character for the great success. There

have also been conversions such as Donkey Kong or Super Mario, but Super Mario Bros did not yet exist on the Spectrum. I almost missed it, because we hadn't heard much about the Russian release in this country, but already in 2019 a quite detailed conversion was implemented by Sergei Andreevich Smirnov (Russia), and in 2020 another almost identical Covid version followed.

It also has to be said, you almost can't do better. The levels are 1:1 reproduced, the sound is exactly right and the opponents or the Mario Sprite are also very well implemented. It is one of the most popular Jump'n Runs, the graphics are right, but is it also playable? Unfortunately, I have to limit myself a bit here. The game speed is comparable to Super Nintendo, Amiga etc., but it is not possible to run back, so it can happen that you lock yourself in if you make a mistake and can't go back. This is a bit of a pity. Graphically, the background graphics or at least the colours could have been improved a bit, but otherwise it's really a realization that you wouldn't have expected on the Spectrum. Bravo. For Mario fans a must, for all others certainly a very good Jump'n Run.

Downloads under:

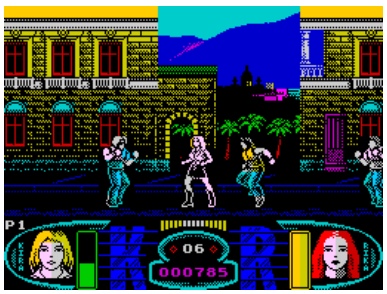
Super Mario Bros128k:

https://spectrumcomputing.co.uk/entry/35108/ZX-Spectrum/Super_Mario_Bros_128K

Covid-19 Edition:

https://spectrumcomputing.co.uk/entry/37744/ZX-Spectrum/Super_Mario_Bros_COVID-19_Edition

»ANGELS«
© 2021 ZOSYA ENTERTAINMENT
REVIEW BY THOMAS & NOAH



I have always been a big fan of Beat'em ups, Renegade, and especially Target Renegade (with player mode) were my favorites. Later the games became more complex with moves that required multiple combos and for me the fun of the game was then lost. How would I fare with Angels?

The game begins, as Zosya often does, with a long intro that reveals how the two "angels" came to earth. Here you now have to prove yourself and beat up the bad guys. Of course I had to try the 2-player mode right away. The two angels "Kira" and "Rika" have different abilities and therefore different blows. As a special feature, an energy ball can also be shot, also something that differs from the predecessors. But the motivation is not less, you have a lot of possibilities to eliminate the opponents and also to recharge energy. Unfortunately, you can also hit each other, so be careful!

Graphically, the whole thing is once again a treat. Starting with the intro, you have to concentrate even in the game to avoid being hit by amazement. Completely unnecessary, but just great: there are even cars driving around in the background. It just shows how much energy Zosya puts into its games and reveals that they are still not at the limit. The levels also seem endless, in the test there was always something new to discover. According to the description, there is also a shooter level, but I didn't get to that in this review.

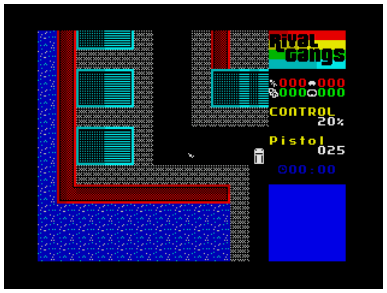
Great AY sounds can be heard in the menu, opening credits, as well as during the game.

If you want to get beaten up graphically and musically, you have the choice: download it for free at Zosya or buy it right away with a great box and extras. However, you can only pay in rubles or British pounds, for whatever reason not with euros.

Download at:

https://www.zosya.net/product/angels/

»RIVAL GANGS«
© 2021 PRESH
REVIEW BY THOMAS



Which gamer doesn't know GTA? Yes, that gameplay where you go through a world and can do whatever you want (and also have to live with the consequences). Exactly the one that exists on PC and new consoles, but on the Spectrum?

Here's "Rival Gangs." It may be highly simplified, especially graphically, but it promises a lot that I wasn't able to explore all in the review. You don't have to do anything, but if you want to advance in the game, you join one of the two rival gangs and do what they want you to do. Or you don't...

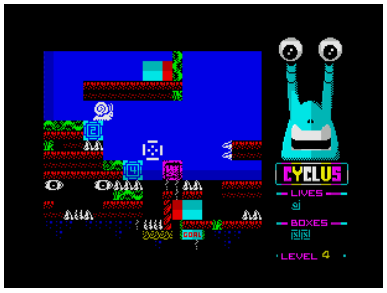
Ok, since I want to get ahead in the game, I run over the rivals and take out disagreeable opponents. I must admit that this is also fun. For the task you should find weapon and ammunition, but you can also hijack a car, even police cars are stealable.

The game offers average graphics with very small sprites. In return, the world in which you move is all the larger. It takes a while to find your way around. In the long run, the tasks are unfortunately a bit monotonous; in the end, it's always about eliminating the rival gang.

You can't expect much in the way of sounds, nor do you have a car radio like in later GTA releases, but that would be too much to expect. In the end you have a nice action game, for which you should plan some time for the solution, because there is no such thing as levels and level codes. Good for the one who can take a snapshot.

If you want to become a gangster boss: Download at:
https://spectrumcomputing.co.uk/entry/36971/ZX-Spectrum/Rival_Gangs

»CYCLUS«
© 2021 MIGUETELO
REVIEW BY THOMAS



Sometimes even snails can be just too fast. I had to make this experience with Cyclus, because these snails wander like lemmings always following their nose. To prevent them from falling into obstacles, the player has to keep them from doing so by means of well-placed crates. There are two problems with this. One is the limited number of crates, the other is the speed of the snail.

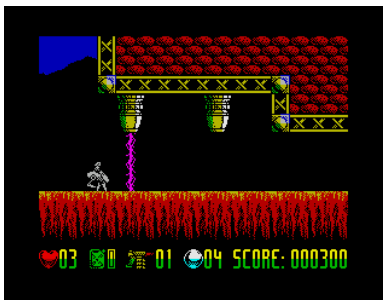
The game offers colourful graphics, funny AY soundtrack and varied gameplay. The levels get more complex, but are always doable. You just have to be fast. The repetition factor is correspondingly high. The game is easy to understand and a lot of fun.

Definitely download from :
https://spectrumcomputing.co.uk/entry/36968/ZX-Spectrum/Cyclus

»LAVA«
© 2021 ZOSYA
REVIEW BY THOMAS

All programmers at Zosya would have become very rich... if they had already made games for the Spectrum in the early 80s. "LAVA" gets along even with only 16kB and is nevertheless not less interesting.

On a strange planet (in a strange space suit and a strange vehicle) you have to go on an exploration tour. Already the first obstacles appear. By clever timing like in many platform games you get over the obstacles by jumping. Only this is not a platform game. The vehicle can't hop, it moves crawling forward or backward, and if you've collected the appropriate extra, the pilot can also leave the vehicle and fly for a few seconds, which is mandatory for some items.



The game is at least so long that I couldn't see an end in the review, so "only" 16k is not fundamentally negative. The graphics are colourful as usual and the controls are precise. At least at the beginning there is a lot to discover, but surely the game gets boring after a few times of playing, because it repeats itself.

Zosya of course did without a long intro and sound here, but still made a game that was not yet available in this quality on 16k. Of course, I don't think anyone still uses a 16k Spectrum and is therefore particularly happy to have a game that fits in their memory again after 40 years, but still I find it amazing.

The game is not commercially released, you can only download the free version:
https://spectrumcomputing.co.uk/entry/36845/ZX-Spectrum/Lava_2021

This was our review of the year 2021. Together with the programs on the last two SCENE+ issues 76 + 77 you have a total overview of all programs that rate above average and special. In addition, there were also an increasing number of commercial releases that we have not yet presented here. We hope, however, that we will make up for it.

»RETRO-ROBOT HERO 1«
BY JOACHIM GEUPEL

First of all the question: What has this article to do with the ZX Spectrum?

Answer: Nothing at all!

Maybe apart from the fact that the robot presented here appeared at about the same time as the ZX Spectrum. But I don't want to withhold it from you. I found the article interesting at the time, although today it is more likely to be seen as a curiosity or a satirical piece of writing. However, this robot paved the way for the vacuum cleaner and lawn mower robots that roll around our house today and take our cats for a walk.

ELECTRONICS MAGAZINES OF THE 80S

During my training as an electronics technician, there were various other electronics magazines with different focuses in addition to the Dutch-German electronics magazine ELEKTOR. ELRAD, Funkschau and ELO come to mind spontaneously. ELRAD was published from 1977 to 1998 and was aimed at ambitious hobby electronics engineers; I subscribed to it for many years. The magazine ELO was also one of the magazines that did not live through the 2000s. It was published from 1976 to 1989 and was also aimed at amateur electronics engineers. Only the Funkschau has survived. It was

first published in 1928 and was aimed at "technically interested radio listeners and electronics hobbyists". The Funkschau as such also no longer exists. It was very recently renamed "connect professional" on February 1, 2023, and is now aimed more at industry and developers working there than at amateur electronics engineers and/or retro computer enthusiasts, such as ourselves.

Elektor magazine, published by the Dutch media group Elektor International Media, first appeared in 1961 and is still published in German, English, French and of course Dutch.

With the exception of Elektor, almost all electronics magazines have been discontinued.

What all three magazines have in common is that, from the 1980s onwards, they were also concerned with home computers. They could not avoid opening up their almost exclusively analog content to home computer users.

Sad is the fate of the actually very good magazine ELO. After three changes in the editorship, this magazine was no longer recognizable as an electronics magazine. It had turned into a purely technical magazine and covered topics such as the construction of Steinway concert grand pianos or reported on animal experiments. I myself had long since lost interest in this magazine; I was clearly no longer part of the target group of readers. The electronics section appeared for a few more years only as a supplement and was in the end only an advertising section for electronics kits. The ELO magazine was continued by the Franzis publishing house as an online project from 2008, but it no longer exists. If you enter the term "ELO magazine" in a search engine on the Internet, you will land on all kinds of pages that have the abbreviation "ELO" in their name, but otherwise have nothing to do with this magazine anymore.

But enough of the long preface.

Four of the magazines are still in my collection. In one of them I found the following article. One of my lecturers, a very dedicated man, invited a few of us to a demonstration of the robot "HERO 1". This was presented as part of an adult education course. Each of us, who had participated in this presentation, was afterwards inspired by the desire to own such a robot as well. But for us poor trainees it was definitely too expensive with 4000 DM.

An anecdote about this robot is that 41 years ago, it was in the news and was enthusiastically hailed - among other things, an author predicted that by the end of the 1990s, every household would have a household robot that would do the hard work for you, so that you would have more time for your children. I waited in vain for a household robot, but I still had time for my daughter.

The following text is to be taken a quite ironic basic tone - for which reason otherwise Asimov's robot laws are indicated here. I will not withhold them from you. Who knows, for what one can still use them.

»ONE-ARMED HERO: HERO 1« FROM THE MAGAZINE »ELO«,

ISSUE 4, APRIL 1983

Behind the heroic name "HERO 1" is an abbreviation of "Heath Educational Robot", and what the company Heath-Zenith presents with it is a primitive little gnome that can move lively back and forth and do all kinds of contortions. The manufacturer therefore does not speak of a built-in microcomputer, but of HERO's "brain", whose senses are made up of sensors and whose muscles are made up of electric motors; to feed it, it is given electric current, which will not cause the little hero's veins to calcify even in a hundred years.

This robot, about 50 cm high, moves on rollers, can hear and see (i.e. perceive sounds and brightness); it is able to detect movements, measure distances and thus avoid obstacles. Of course, Hero can also turn his stylized head and move his grasping arm, which looks like a pirate's arm, but is much more flexible than it. If you wish, the little dwarf will also grab a glass of whiskey and hand it to you, provided you've hammered this into him beforehand (literally). The handling of this robot requires a certain training, and so regular courses are already offered for it, which future masters (and mistresses) can complete in the self-study or in the larger circle. Of course, the whole thing is not a toy for unfulfilled playboys, but

Hero Jr. (RT1)

with Hero the user should learn how to handle industrial robots. If you also do not want to miss the presence of this devoted servant, contact the manufacturer.

Like many of its brothers, such a metal companion is certainly for sale: For about DM 4000,- you can let it roll over your threshold at home - if necessary even with a glass of champagne in its claw! However, please make sure that your little hero always obeys the three iron laws of robotics (the robots' code of honor), which we have reprinted here for safety's sake.

(Heath-Zenith GmbH, Postfach 10 20 60, 6072 Dreieich).

The three basic laws of robotics formulated by Isaak Asimov

1. a robot must not injure a human being or cause harm through inaction.
2. a robot must obey the orders of humans, unless such orders conflict with the first law.
3. a robot must protect its own existence as long as its actions do not contradict the first two laws.

WHAT HAPPENED TO HERO I?

HERO 1 got a few more successors. HERO 1, which is actually called ET-18, was a robot kit, just like its successors. Development began in October 1979, and the first units were available from 1982.

HERO 2000

It was followed by HERO Jr, also known as RT-1. Both had in common that they were controlled by a Motorola 6808.

The HERO 1 was programmed via a hex keyboard, but could be expanded with a Basic module. The programs were stored on a compact cassette.

The HERO Jr. was a smaller version of the Hero 1, it had less memory, but could be expanded to 10 kB with a plug-in module. It was intended more for entertainment.

HE-RObot

Hero 2000, ER-19, in turn, was a significantly improved version. It was controlled by an Intel 8088, could be upgraded to 576 kB and had a built-in basic. Instead of a hex keyboard, programming was done via a terminal using RS-232. Programs were stored on a 360kB floppy disk, suggesting that the drive was ent-wither a double-sided 5 ¼-inch or a single-sided 3 ½-inch floppy.

In December 2007, Heathkit, as Heath-Zenith is now known, introduced a new robot for educational purposes. This robot is called HE-Robot and is based on an industrial robot. The processor is an Intel Core Duo, which is located on a Mini-ITX board. It is programmed via Microsoft Visual Studio. The programs are stored on a 80GB hard disk.

Finally, I would like to note that I still don't have a robot rolling around my house. So far, the robots have not been able to manage the stairs in my house. And as long as they can't do that, I won't be getting one either.

All the information can be found on Wikipedia, where there is also much more to read. Another source to recommend is the website

https://www.theoldrobots.com/.

Here you can find a lot more retro robots.

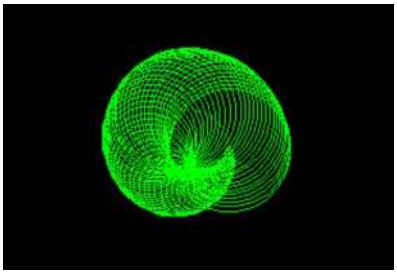
By the way, it's not quite true that I don't have a robot standing around. This guy is a friend from childhood, which I got for Christmas when I was 11 years old. In the meantime, it is just as rickety as I am, but it still works.

An old friend from childhood.

BASIC GIMMICKS

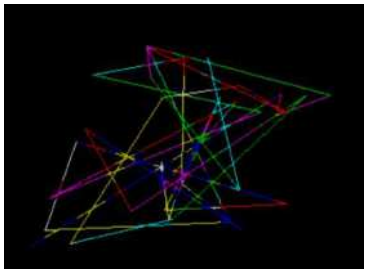
CIRCLES AND SPIRALS

The program produces growing circles, arranged in turn in a circle, in endloaser sequence. It is best to run the program in the emulator at increased speed.



```
  5 REM Circles and spirals
    by Joachim Geupel
 10 BORDER 0: PAPER 0:
    INK 7: BRIGHT 1: CLS
 20 FOR a=1 TO 250
 30 CLS
 40 LET f=INT (RND*7)
 50 IF f=0 THEN GO TO 40
 60 INK f
 70 LET r=INT (RND*50)
 80 IF r<5 THEN GO TO 70
 90 LET ch=120
100 LET cv=90
110 LET v=1
120 FOR n=2*PI TO 0
    STEP -(PI/r)*INT (RND*5)
130 LET v=v+1
140 IF v>45 THEN LET v=45
150 LET x=r*COS n+ch
160 LET y=r*SIN n+cv-10
170 PLOT x,y
180 CIRCLE x,y,v
190 NEXT n
200 PAUSE 20
210 NEXT a
220 PRINT n,v
230 REM PRINT n,v
```

LINES

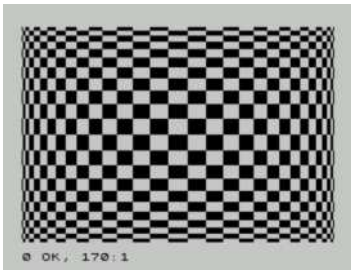


Endless lines are also beautiful...

```
 05 REM Lines
 10 BORDER 0: PAPER 0: INK 7:
    BRIGHT 1: CLS
 20 FOR a=1 TO 250
 30 CLS
 40 LET f=INT (RND*7)
 50 IF f=0 THEN GO TO 40
 60 INK f
 70 LET r=INT (RND*50)
 80 IF r<5 THEN GO TO 70
 90 LET ch=120
100 LET cv=90
110 LET v=1
120 FOR n=2*PI TO 0
    STEP -(PI/r)*INT (RND*5)
130 LET v=v+1
140 IF v>45 THEN LET v=45
150 LET x=r*COS n+ch
160 LET y=r*SIN n+cv-10
170 PLOT x,y
180 CIRCLE x,y,v
190 NEXT n
200 PAUSE 20
210 NEXT a
220 PRINT n,v
230 REM PRINT n,v
```

PILLOW

A small but sophisticated graphics gimmick by John Matcalf.




```
  1 REM Pillow
  2 REM by John Matcalf
  3 REM Facebook Aug. 6th, 2018
  4 REM
 10 OVER 1
 20 LET x=0
 30 FOR i=1 TO 16
 40 FOR a=1 TO i-(x>128)
 50 PLOT x,0: DRAW 0,175
 60 LET x=x-SGN (x-128)
 70 NEXT a
 80 LET x=255-x+i
 90 NEXT i
100 LET x=0
110 FOR i=3 TO 13
120 FOR a=1 TO i
130 PLOT 0,x: DRAW 255,0
140 LET x=x-SGN (x-88)
150 NEXT a
160 LET x=175-x
170 NEXT i
```

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